

**TABLE OF CONTENTS**

<b>Letters to NAUG</b>	<b>2</b>	<b>My Favorite Macro</b>	<b>24</b>
<ul style="list-style-type: none"><li>• A suggestion to help you use @IRR and @NPV.</li><li>• Use the BBS to transfer files.</li><li>• Member recommends Diconix printer.</li></ul>		<ul style="list-style-type: none"><li>• How to make it easier to produce special characters with SuperFonts.</li></ul>	
<b>Spreadsheet Tips</b>	<b>5</b>	<b>Quick Tip</b>	<b>27</b>
<ul style="list-style-type: none"><li>• How to use @PV.</li></ul>		<ul style="list-style-type: none"><li>• How to delete subdirectories.</li></ul>	
<b>AppleWorks Applications</b>	<b>9</b>	<b>ReportWriter Tutorial</b>	<b>28</b>
<ul style="list-style-type: none"><li>• How to keep your financial records in AppleWorks — Part 2.</li><li>• How to prepare tax reports.</li></ul>		<ul style="list-style-type: none"><li>• How to use ReportWriter's numeric functions.</li></ul>	
<b>Applied Engineering Update</b>	<b>12</b>	<b>Beagle Bros Update</b>	<b>33</b>
<ul style="list-style-type: none"><li>• Two new fax modems that work with GS/OS.</li></ul>		<ul style="list-style-type: none"><li>• News about new and enhanced Beagle Bros products.</li></ul>	
<b>Inside AppleWorks</b>	<b>13</b>	<b>Members Helping Members</b>	<b>34</b>
<ul style="list-style-type: none"><li>• Spreadsheet data structure — Part 2.</li></ul>		<ul style="list-style-type: none"><li>• More than 125 members who offer help with Beagle Bros enhancements.</li></ul>	
<b>AppleWorks News</b>	<b>19</b>	<b>Electronic Index Disk Update</b>	<b>35</b>
<ul style="list-style-type: none"><li>• Late news for AppleWorks users from NAUG, A2 Central, Apple, ISTE, JEM Software, Quality Computers, S.A. AuTeur, Seven Hills Software, SoftSpoken, and WestCode.</li></ul>		<b>NAUG Membership</b>	<b>36</b>
		<b>NAUG Classifieds</b>	<b>36</b>

**Support for AppleWorks and ///EZ Pieces Users**



## A Caveat about @IRR and @NPV

Dear Cathleen,

I appreciate Stan Hecker's excellent articles that describe how to use the financial functions in AppleWorks, but I want to add one caveat to his work:

Remember to define contiguous cells when you use the @IRR and @NPV functions.

Users often design spreadsheets with blank columns or rows between cells, or with vertical lines separating columns of figures. That improves the readability of the spreadsheets but causes errors in @IRR and @NPV calculations; both of these functions interpret cells that are blank or that contain a label as a zero.

AppleWorks displays an ERROR message when you do this. Some other spreadsheet programs (e.g., Lotus 1-2-3 and Excel) return an answer that is calculated for one or more periods of time *more* than the period intended. The result is an answer which is significantly less than the correct figure.

Kent Hayden  
Tacoma, Washington

---

## Another Use for the BBS

Dear NAUG:

Thanks for the article in the October issue of the *AppleWorks Forum* that described how to use NAUG's electronic bulletin board to transfer files between computers. I now use those techniques to transfer files between my IBM computer at work and my Apple II at home. When I don't finish my work at the office, I upload the IBM file in ASCII

The **National AppleWorks Users Group (NAUG)** is an association that supports AppleWorks users. NAUG provides technical support and information about AppleWorks and enhancements to that program. Our primary means of communicating with members is through the monthly newsletter entitled the **AppleWorks Forum**.

format to the board. In the evening, I download the file into the Apple and read the data into AppleWorks. At night, I reverse the process to prepare my files for the office.

You never know when an idea mentioned in the newsletter has such a significant impact on a member's working habits. My thanks to NAUG for the bulletin board service and for letting members use the board to transfer files between computers.

Armond Moore  
Three Rivers, Michigan

*[Ed: NAUG members might be surprised to learn how many of their colleagues use the group's bulletin board to exchange information, get answers to questions, transfer files, and download templates, utilities, and other files. Last month, 274 members placed 1,768 calls to the board and left 831 messages. Those members downloaded 689 templates, files, and utilities from the system, uploaded 32 new files, and transferred 117 files to themselves and to other members. With all that activity, more than 96% of the callers reached NAUG's multi-line board on the first try.]*

NAUG members interested in using the Electronic Forum should send NAUG a self-addressed, stamped, #10 envelope and request a free copy of the Electronic Forum Command Summary which describes how to use the services available on the system.]

## AppleWorks Forum

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Associate Editor: Warren Williams

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## User Recommends Diconix Printer

Dear Cathleen,

After reading Rich Brossman's review of the HP DeskJet printer in the August 1990 issue of the *AppleWorks Forum*, I thought that my fellow NAUG members might like to know about the Diconix 300W which I recently purchased from a DAK catalog for \$399 plus \$16 s/h. [Ed: DAK's phone number is (800) 325-0800.] The Diconix 300W is a wide carriage, ink jet printer that can accept continuous feed or single sheets of paper up to 15-inches wide. The printer, which produces exceptional output from AppleWorks, SuperFonts, and Publish It!, can print on envelopes or single sheets of paper without removing the tractor feed paper from the unit.

The Diconix is fast and offers three qualities of text output. Kodak claims that the Diconix prints in draft mode at 258-310 characters per second (cps), near letter quality mode at 61-73 cps, and proportionally-spaced, highest quality mode at 36-43 cps. Although I've never confirmed those claims, the Diconix is fast enough for my applications.

DAK sells the printer with either a serial or parallel interface and includes Quatro, WordStar, and other MS-DOS software in the package. The company offers a 30-day satisfaction guarantee.

Herb Bunker  
Portland, Maine

[Ed: Although the Diconix 300W and HP DeskJet are both relatively inexpensive inkjet printers, NAUG believes the two units serve different users.

The Diconix accommodates wide sheets of paper and continuous feed paper and forms. These options are not available on the 8.5" x 11" single-sheet-only DeskJet. At \$399, the Diconix is about 25% less expensive than the DeskJet 500 equipped with the recommended Epson emulation cartridge. (You can use the DeskJet in its "native

### Figure 1: Output from the Diconix 300W

Compatible with SuperFonts. This is New York printer handles fan-fold paper for

APPLEWORKS compatible: will accept print: underline, superscript, bold and special

The Diconix fonts include a Near Letter Quality

This is Near Letter Quality, but even though it cuts sheet and tractor feed paper - no special

The fan-fold paper need not be removed from the printer. It is controlled by depressing both line feed

An italic font is available using the SuperScript

A condensed font is also available.

### Figure 2: Output from the DeskJet Plus

Courier 10/20

Underlined

**Boldface**

"Proportional"

6 Characters per inch  
aracters per inch Emphasis

10 characters per inch Courier  
0 characters per inch Courier Emphasized

12 Characters per inch Elite  
12 Characters per inch Elite Emphasized

SuperScript Bold

mode" without the Epson cartridge but the native mode printer cannot produce proportionally spaced output from AppleWorks and is not compatible with TimeOut SuperFonts and many other ProDOS 8 applications.)

Although the Diconix output is acceptable, the 300 dots-per-inch, laser-like quality from the DeskJet is superior to the dot-matrix-like output from the Diconix. Figures 1 and 2 present sample output from both printers.]



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# How to Use @PV

by Stan Hecker

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*This is the fourth in a series of articles that describe how to use AppleWorks 3.0's new financial functions. This month, Mr. Hecker describes how to use @PV to analyze loans and leases. The author assumes that you read the previous articles in this series.*

---

The more assets you have to manage, the more important it is to make well-informed financial decisions. As you learned from the earlier articles in this series, the financial functions in AppleWorks 3.0 can provide useful insights into current and future conditions.

This month I will describe AppleWorks' present value function; a function that can compute the present value of an asset based on your assumptions about the future. I will describe the syntax of @PV and describe how to use the function to (a) determine how much money you can borrow, (b) compute the balance of a loan, and (c) help with lease/purchase decisions. I will ignore all tax considerations in these analyses.

### Syntax of @PV

@PV statements follow this syntax:

@PV(rate, term, payment [, future value, type])

where "rate" is the interest rate, "term" is the number of payments, and "payment" is the amount of each payment.

As with all financial functions, you must express all the variables in the same unit of time. If you will make monthly payments to repay a loan, you must enter the interest rate, the term (i.e., the number of payments), and the amount of each payment as monthly figures.

The square brackets indicate that the "future value" and "type" entries are optional; do not type the brackets when you enter the formula. I will describe how to use these options later in this article.

### A Mortgage Loan Example

Let's start by using the @PV function to determine

how much money you can borrow if you know how much you can afford to repay each month.

Imagine that you can afford \$500 per month to repay the principal and interest on a mortgage. Let's assume that the bank will lend the money at 10.5% interest for 30 years. How much can you afford to borrow?

You know your maximum *monthly* payment, therefore you should express all figures in months. The interest rate is 10.5% per year, so you will divide that figure by 12 to get the monthly interest rate. You must also express the number of payments in months; over 30 years you will make 30\*12, or 360 monthly payments.

Put the cursor in any AppleWorks spreadsheet cell, enter the formula @PV(.105/12,30\*12,-500), and press the Return Key. AppleWorks will immediately display "54660.38". Under these conditions you can afford to borrow up to \$54,660.

Note that you expressed the payment as a negative number; it is money out of your pocket. The result of the calculation is a positive number; the present value of the stream of payments you will give the bank. Also note that you did not enter a "future value" or "type" into this formula. The "future value" of this loan is zero; there is no balance due at the end of the loan. You can also omit the "type" entry because you will make your payments at the end of each month.

### Current Mortgage Balance

@PV can also determine the remaining balance on an existing loan.

Imagine that you accepted the loan in the earlier example and borrowed \$55,000 at 10.5% for 30



years. Your exact payment is \$503.11. You've repaid the loan for eight years and now want to compute the unpaid balance on the loan. The interest rate is .105 divided by 12 months; the remaining term of the loan is 22 years times 12 months, and the payment is 503.11.

Put the cursor on any cell, enter the formula `@PV(.105/12,22*12,-503.11)` and press the Return Key. AppleWorks will immediately report that your remaining balance is \$51,733.29.

Once again you did not enter "future value" or "type" into the `@PV` formula. There will be no balance due at the end of the 30-year period, so the loan has no future value. And since you make all payments at the end of each period, you do not have to enter the "type" into the formula.

## Mortgage Interest and Taxes

You can also use `@PV` to determine the amount of interest you paid on a loan during the year. Here is the logic for that calculation:

$$\begin{array}{r} \text{Total paid during the year} \\ - \text{Reduction in principal during the year} \\ \hline \text{Interest paid during the year} \end{array}$$

It is easy to determine the total amount you paid during a year; just multiply your monthly payment by 12. Determining the reduction in principal during the year is a bit more complex. You have to use the `@PV` function to determine the balance due on the loan at the end of two succeeding years and then use the formula:

$$\begin{array}{r} \text{Balance due at the end of previous year} \\ - \text{Balance due at the end of this year} \\ \hline \text{Amount you paid toward the principal this year} \end{array}$$

Figure 1 presents a sample calculation using the figures for your hypothetical mortgage. Note that the "term" of the `@PV` functions uses 23 and 22 as the number of years. These formulas calculate the balance at the end of the seventh year ( $30-7=23$ ) and eighth year ( $30-8=22$ ) of the loan. Taken in combination, they show the changes which occurred during the eighth year of the loan.

**Figure 1: Mortgage Interest Paid in a Year**

Total payment:	\$503.11 times 12:	= \$6,037.32
Last year's balance:	<code>@PV(.105/12,23*12,-503.11):</code>	= \$52,305.55
This year's balance:	<code>@PV(.105/12,22*12,-503.11):</code>	= \$51,733.29
Change in principal:	Last year minus this year:	= \$572.26
Interest:	Total payment minus change in principal:	= \$5,465.06

## Loans with A Future Value

So far you used `@PV` to analyze one type of loan; present value annuities that have no value at the end of the transaction. Not all loans are this simple, and mortgage loans with variable rates and "balloon" payments in the *middle* of the stream are too complicated to consider in this article. However, loans with "balloon" payments at the *end* of the stream are less complex and are worth examining.

The "balloon" payment is often the depreciated value of the asset; the car, boat, trailer or whatever. At the end of the stream of payments you can often either pay the "balloon" and keep the asset, or return the asset to the financing agent. Let's examine the most common of these arrangements; an automobile lease.

An automobile lease is a present value annuity that has a future value. That is, the leased car has some value at the end of the lease. A lease is also one of the few present value annuities which you repay at the *beginning* of each remittance period (usually, each month). Thus, you will also use the "type" option to analyze lease contracts.

Let's use the `@PV` function to compare the costs of buying and leasing a car.

## Should You Buy or Lease?

Imagine that you want to buy a car that costs \$14,000. Your bank will finance 80% of the purchase price (\$11,200) at 13.5% interest for 48 months. The payment is \$303.25 per month.

In bargaining, you learn that you can lease the car for 4 years at \$250 per month plus some minor up-front expenses. The lease costs less per month than buying because the car has a "future value"; the dealer will sell the car at the end of the lease.

But which is a better deal, buying or leasing?



## Figure 2: Determining Car Resale Value

Purchase price	= \$14,000.00
Loan value: Price * .8	= \$11,200.00
Payment on the loan: @PMT(.135/12, 48, 11200)	= -\$303.25
Final guess at residual value	= \$7,978.00
@PV function result here*: @PV(.135/12, 48, -250, -7978, 1)	= \$14,000.23
*must equal purchase price above	

Eventually you will enter -\$7,978 as the future value of the car and the @PV formula will return a present value of \$14,000.23. If the leasing company pays the interest rate you would pay, then the company estimates that the car will be worth just under \$8,000 in four years.

Figure 2 summarizes these calculations;

First, you should determine the "future value" of the car; how much the dealer expects to get for the car at the end of the lease.

### Using @PV to Estimate Future Value

Let's assume that (a) the dealer pays the same 13.5% annual interest rate you would pay, (b) the lease is 48 months long, (c) the payment is \$250, (d) the car will be worth about \$7,000 at the end of the lease, and (e) the lease payments will be made at the beginning of each month. (The optional "type" specification accepts either a "1" or a "0". When "type" is blank or set to zero, AppleWorks assumes that all remittances are made at the end of each period. By setting "type" to "1", you tell AppleWorks that the payments will be made at the beginning of the month.)

Of course, \$7,000 is merely your guess at the future value of the car. You will adjust that figure until the present value returned by the formula is close to the \$14,000 purchase price. That will yield the dealer's projection of the car's value at the end of four years.

Put the cursor in any empty spreadsheet cell, enter the formula @PV(.135/12, 48, -250, -7000, 1), and press the Return Key. You pay the \$250 a month and you give up the \$7,000 equity in the car at the end of the lease; therefore you enter these as negative numbers in the formula. AppleWorks will display "13428.59". This figure is too low; you know that the present value of the car (the purchase price) is \$14,000.

Now change the \$7,000 to a "higher" value. (You can either use the Apple-U command to edit the formula or revise the formula so it uses a cell reference.) Try different values until the formula yields a result close to \$14,000.

Now you can begin to compare the true cost of leasing and buying the car. However, lease/purchase decisions are more complex than they first appear, and I will describe how to develop lease/purchase templates in the next article in this series.

### A Dream Vacation

Now imagine that you want to take a year off from work to take a sailboat voyage or to do volunteer work. You need \$1,500 per month, and you are willing to totally deplete your savings during the year. You will need \$18,000 (\$1,500 per month for 12 months), but since you know about the time value of money, you suspect that you won't need that much on deposit at the beginning of your year off from work.

Your savings are in an investment that earns about 13% per year, compounded monthly, and you can depend on maintaining that rate. How much do you need to finance your dream vacation?

The interest rate is 13% divided by 12 months. The term is 12 months. The payment amount is a positive \$1,500, money into your pocket each month. Put the cursor in any blank spreadsheet cell, enter the formula @PV(.13/12, 12, 1500), and press the Return Key. AppleWorks will display -16794.06 to indicate that you only need to deposit \$16,794 to realize your dream.

### A Lottery

Here is an example of @PV that is just fun. It is based on a concept drawn from Tom Weishaar's book *Your Best Interest* and various government sources.



## Spreadsheet Tips...

Suppose that your state lottery reaches \$21 million and that the winner will collect a \$1 million the first year and \$1 million each additional year for twenty years. You also learn that the lottery system is healthy and that its investments are earning 12%.

How much will it cost the state to pay the winner \$21 million at the rate of \$1 million per year?

Put the cursor in any spreadsheet cell and enter the formula @PV(.12,21,1000000,0,1). The interest rate is 12%, the period 21 years (21 payments), the payment is a \$1,000,000 paid into the winner's pocket, the future value is zero (a placeholder), and the payments occur at the beginning of each period.

Press the Return Key and AppleWorks will display -8469443. It costs the state less than \$8.5 million to buy the annuity to pay the winner. The annuity costs even less if the state uses investments which pay quarterly, monthly, or daily. Is it any wonder that lotteries are popular among hard-pressed state governments?

### Summary and a Look Ahead

As you can see, the @PV function can answer a number of important financial questions that will help you plan your loans and make purchase/lease decisions.

The annuity functions in AppleWorks complement each other in power and utility. Next month I will describe how to use a combination of these functions to determine whether to lease or buy an asset.

*[Stan Hecker is on the administrative staff at Michigan State University, East Lansing, Michigan, and is a partner in H&H Consulting, a Michigan concern specializing in school district financial and population analyses.]*

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# How to Prepare Tax Reports

by Diana Crawford Diamond

---

*This is the second of two articles that describe how to use the AppleWorks data base module to maintain your financial records. This article describes how to prepare reports that summarize your tax data. The author assumes that you read the previous article in this series and that you know how to generate a tables format report.*

---

I treat my checkbook data base like the shoe box where I used to toss my tax records. During the year, I enter my financial transactions just as I used to put everything in the shoe box. At tax time, I use the data base's reporting power to print a report that summarizes my activity during the year. The report makes it easy for my accountant to prepare my tax forms and is useful if I need documentation for an IRS audit.

## Entering Your Data

As you saw in last month's article, you type an entry in the "Tax Category" field for each tax-related transaction. Tax Category entries should be short and consistent. Whenever possible, use words that correspond to the lines on the tax form. *Figure 1* contains a list of some suggested tax categories. Note that your Tax Category designations should use capital and lower-case letters consistently. Although AppleWorks does not distinguish between upper and lower-case letters when it selects records, the program does differentiate between these characters when you use the Apple-G command to group records in a report.

You should also enter the letter "I", "D", "T", or "Z" in the Code category in each record. "I" indicates an income transaction, "D" stands for deduction, "T" is a tax payment, and "Z" is a capital expenditure.

Enter an "X" in the Code category for salary checks, mortgage payments, and monthly interest posted to your checking account. Year-end records such as W-2 and 1099 forms will supersede the information in "X" records. However, these records could prove helpful if you need to estimate

**Figure 1: Suggested Tax Categories**

Code	Tax Category	Code	Tax Category
D	Assets Sales	I	Interest
D	Business	I	Miscellaneous
D	Charity	I	Rent/Royalty
D	Child Care	I	Salary
D	Interest	T	Tax-City
D	Interest-Mortgage	T	Tax-IRS
D	Investment	T	Tax-Miscellaneous
D	Medical	T	Tax-Property
D	Miscellaneous	T	Tax-State
D	Moving	X	Interest-Monthly
D	Theft Loss	X	Mortgage Payments
I	Assets Sales	X	Salary Check
I	Business Draw	Z	Capital Purchase
I	Dividends		

your income or if a tax examiner wants confirmation of a specific transaction.

## Preparing the Report

Let's assume that it is now the end of the year and you want to generate a tax report. I will describe how to create a report called "Tax Organizer". Then I will describe how to prepare two modified copies of this report to handle your income and deduction transactions. The Tax Organizer Report in *Figure 2* summarizes the data for a woman who submits a separate tax return. *Figures 3* and *4* assume that the couple will file a joint return.

## Creating the Tax Organizer Report

Follow these steps to prepare the Tax Organizer Report:

1. Open the data base file that you created last month that stores your checkbook and financial tax records.



**Figure 2: Tax Organizer Report**

File: ChecksPlus  
Report: Tax Organizer  
Selection: Tax Category is not blank  
and Signed equals HER

Code	Tax Category	Date	Payee/Source	Deposit Am	Check Amt	Bank	Number	Signed
D	Charity	Dec 1 90	Salvation Army		45	Receipt		HER
D	Charity	May 5 90	St. Joseph's		450	TNB	122	HER
				0	495			
I	Dividend	Dec 31 90	LLCo	344		Tax Note	1099	HER
I	Dividend	Dec 31 90	IBM	145		Tax Note	1099	HER
				489	0			
I	Interest	Dec 31 90	Midtown S & L	411		Tax Note	1099	HER
I	Interest	Dec 31 90	The National Bank	189		Tax Note	1099	HER
				600	0			
I	Royalty	Jun 14 90	Smith Publishers	8358		TNB	Dep	HER
				8358	0			
I	Salary	Dec 31 90	Job One, Inc.	30000		Tax Note	W-2	HER
				30000	0			
T	Tax-IRS	Dec 31 90	IRS-Withheld		8555	Tax Note	W-2	HER
				0	8555			
T	Tax-State	Dec 31 90	VA-Withheld		1000	Tax Note	W-2	HER
				0	1000			
				39447*	10050*			

2. Create a new tables format report called "Tax Organizer" and arrange the columns and column widths to match the report format in *Figure 2*. You might want to include the "For" category in your layout so your reports include descriptions of your financial dealings. My examples assume a simple scenario that does not require this data.
3. Use the Apple-T command to total the "Deposit Amt." and "Check Amt." categories. The IRS accepts dollars with cents rounded off, so specify no decimals in your report. Allow three spaces after the totals to improve the report readability.
4. Issue an Apple-O command and set the characters per inch to 17. Print a sample of the report and adjust the column widths as necessary.
5. Put the cursor on the Tax Category column and issue an Apple-G command. Respond "N" to the "Print group totals only?" and "Go to a new page after each group total?" questions. "Group totals on: Tax Category" should appear near the top of the Report Format screen.
6. Issue an Apple-R command and select all records where Tax Category is not blank. Also select "and signed equals 'HER'" to duplicate the example in *Figure 1*.
7. Issue an Apple-A command and indicate that you want to sort "Several categories". Sort the records based on Tax Category (A-Z), Date (chronologically), and Payee/Source (A-Z). Then issue another Apple-A command and sort the records based on Code (from A-Z).
8. Print a sample report and review the output. Make any adjustments required, and re-print the report.

## Creating Reports for Income and Deductions

You can use the Tax Organizer report to complete your Federal and State Income Tax forms. However, since income and deductions are handled separately on your tax returns, you might find it easier if you print a separate report for each group of transactions. Proceed as follows to prepare those reports:

1. Issue an Apple-P command and indicate that you want to duplicate "Tax Organizer". Name



## Figure 3: Taxable Income Report

File: ChecksPlus  
Report: Taxable Income  
Selection: Code equals I

Tax Category	Date	Payee/Source	Deposit Am	Bank	Number	Signed
Dividend	Dec 31 90	LLI Co	344	Tax Note	1099	HER
Dividend	Dec 31 90	IBM	145	Tax Note	1099	HER
			489			
Interest	Dec 31 90	Midtown S & L	411	Tax Note	1099	HER
Interest	Dec 31 90	The National Bank	189	Tax Note	1099	HER
			600			
Royalty	Jun 14 90	Smith Publishers	8358	TNB	Dep	HER
			8358			
Salary	Dec 31 90	H & L Brown, Inc	35000	Tax Note	W-2	HIM
Salary	Dec 31 90	Job One, Inc.	30000	Tax Note	W-2	HER
			65000			
			74447*			

## Figure 4: Tax Deductions and Tax Payments Report

File: TaxPLUS  
Report: Tax Deductions  
Selection: CODE equals D  
or CODE equals T

CATEGORY	DATE	PAYEE/SOURCE	AMOUNT	REFERENCE NO.	WHO
Charity	Jun 9 90	Red Cross	25	TNB	246 HIM
Charity	Dec 1 90	Salvation Army	45	Receipt	HER
Charity	May 5 90	St. Joseph's	450	TNB	122 HER
			520		
Tax-IRS	Dec 31 90	IRS-Withheld	8555	Tax Note	W-2 HER
Tax-IRS	Dec 31 90	IRS-Withheld	9333	Tax Note	W-2 HIM
			17888		
Tax-State	Dec 31 90	VA-Withheld	1000	Tax Note	W-2 HER
Tax-State	Dec 31 90	VA-Withheld	1234	Tax Note	W-2 HIM
			2234		
			20642*		

reports by selecting records where Code equals "T" and "Z" respectively.

If you to give the report to an accountant, you may want to make the column headings descriptive. You can change these entries either by changing the category names in the data base file or by printing the report to the AppleWorks clipboard and modifying the output with the word processor. Note that I changed the category names in *Figure 4* so "Tax Category" became "CATEGORY"; "Bank" became "REFERENCE"; "Check Amt" became "AMOUNT"; and "Signed" became "WHO". Remember to save the file before you make these changes and then rename the file to indicate that it is a special tax file.

### Tricks and Suggestions

Here are some ideas to help you use this record keeping and reporting system:

- the new report "Taxable Income". Delete the columns named "Code" and "Check Amt." and use the Apple-R command to select all records where Code equals "T". Print the report. *Figure 3* presents a sample Taxable Income Report.
- To create the Deductions Report, duplicate the "Tax Organizer" again and name the new report "Tax Deductions". Then delete the "Code" and "Deposit Amount" columns and use the Apple-R command to select all records where Code equals "D", or "T", or "Z". Print the report. *Figure 4* contains a sample Deductions Report.

Note that you can also use these techniques to print separate tax payments and capital expenditures

- Update your file often. It is easier to spend a few minutes entering your transactions once a week than it is to find the hours needed to enter the data you accumulated during the past few months.
- Track your expenses even if you took the standard deduction last year. You might be surprised by how many deductions you can identify if you keep careful records.
- You will want to review some records at the end of the year before printing your report. Enter two question marks anywhere in those records so you can use the Apple-F command to find and modify those records.



4. At the end of the year you will get W-2, 1099, and other tax forms that you want for tax purposes but that don't affect your bank account. I enter "Tax Note" in the Bank category to distinguish these transactions from bank, charge, and cash records. You can use the "Number" category to enter the government form number: W-2, 1099, and so forth. Enter "Dec 31 90" in the "Date" category for these items.
5. At the end of the year, you should review your records. Use the Apple-R command to select all records where "Tax Category is blank" and use the Apple-F command to search for key words. Also use the Apple-Down-Arrow Keys to scroll through the multiple record layout to see if anything catches your eye.
6. Finally, use the Apple-R command to select all records where "Tax Category is not blank". Review and refine your tax records before using the report formats you created.

### Conclusion

You can use the procedures I described in this article to prepare three tax reports: (1) an organizer, (2) a taxable income report, and (3) a report of deductions, tax payments, and capital expenditures. These reports are your reward for maintaining your data base of checking and financial records throughout the year.

*[Diana Crawford Diamond is a freelance writer and photographer living in Washington, D.C. Her AppleWorks templates called "CheckbookPlus" are available as shareware from the NAUG Public Domain Library.]*



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# New Fax Modems for GS/OS

Applied Engineering recently announced the availability of send-fax capability for Apple IIgs computers. This feature lets you transmit the output from any 16-bit GS/OS-compatible program (such as AppleWorks GS) to Group 3 fax machines. All text and graphics that would print locally will print on the remote fax.

Applied's implementation of send-fax requires an Apple IIgs computer running GS/OS 5.0.3 or later connected to either an Applied Engineering DataLink Express 2400 baud external modem equipped with MNP-5 and send-fax options, or a DataLink 2400 baud internal modem with send-fax capability. These modems come with the necessary GS/OS fax driver software that you install in your System Folder. The software supports delayed transmission, automatic distribution to multiple recipients at designated times, and a print journal.

The suggested list price for a send-fax capable DataLink Express 2400 external modem and software is \$349; the 2400 baud send-fax equipped internal modem costs \$269. Both modems are available at significant discounts from mail order dealers.

Applied can add MNP-5 capability to existing DataLink Express 2400 external modems for \$79; send-fax costs an additional \$79. Owners of Rev. C and Rev. D DataLink 2400 internal modems can add send-fax capability for \$79. All upgrades are factory installed.

Applied is reportedly developing send-fax capability for 8-bit programs such as AppleWorks and Publish-It! and for Apple IIe and IIC computers. NAUG will carry information about these products in a future issue of the *AppleWorks Forum*.

*[Applied Engineering, Box 5100, Carrollton, Texas 75011 (214) 241-6060.]*



# Spreadsheet Data Structure — Part 2

by Dan Verkade

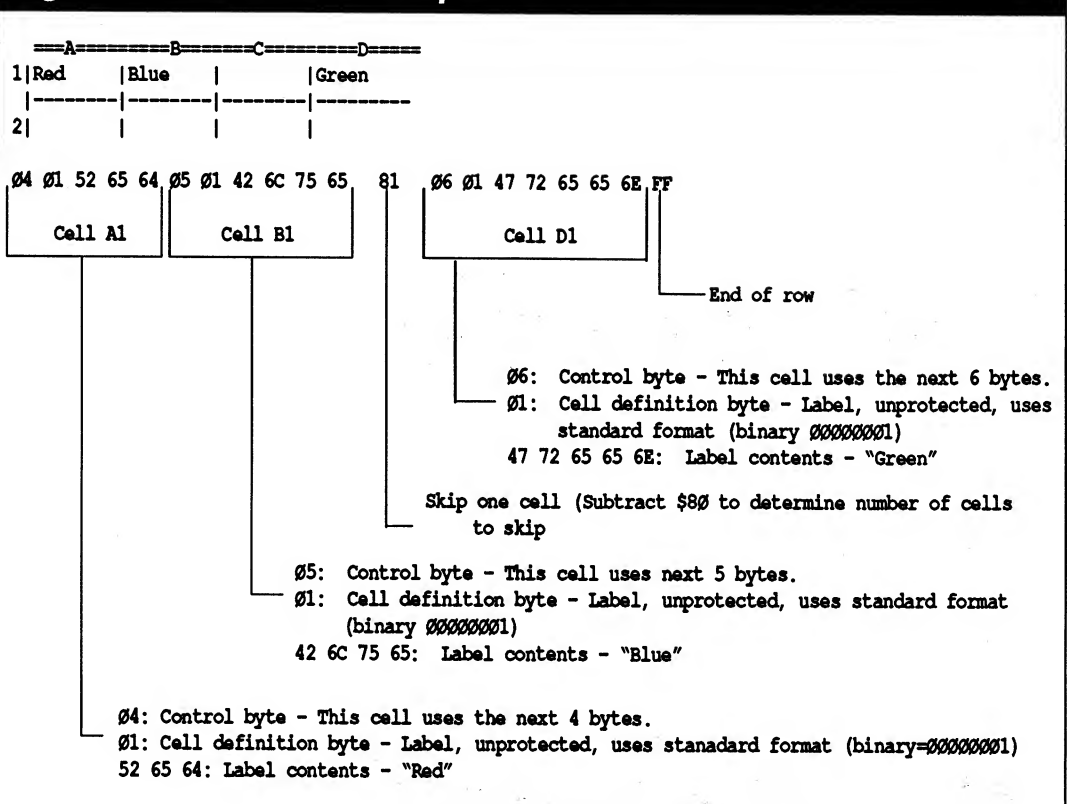
*This is the second of two articles that describe the data structure used by the spreadsheet module in AppleWorks. The author assumes that you read the previous article in this series and also the article entitled "Memory Management" in the August 1990 issue of the AppleWorks Forum.*

Last month I described how the AppleWorks spreadsheet module stores labels, values, and formulas and how the program manages cell references. This month I will describe how AppleWorks arranges its data so you can insert rows and columns, and how it handles recalculations. Finally, I will suggest some tips and hints to help you apply your understanding of AppleWorks' data structure to your spreadsheet templates.

## Inserting Rows and Columns

Randy Brandt's August 1990 article described how the word processor makes room for a new line by moving pointers. The AppleWorks spreadsheet module uses a similar process when you add a row. That is, AppleWorks moves the pointers to the rows below the inserted row and adds a new pointer for the inserted row. AppleWorks also changes all the fixed references in the moved rows.

**Figure 1: The Relationship between Cell Data**

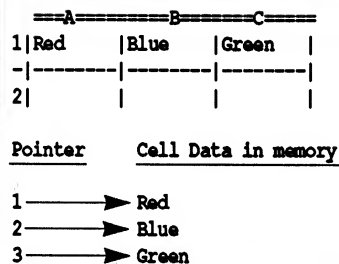


The spreadsheet module also has to deal with inserting columns, but inserting a column is similar to inserting a row. If you recall the data structure of the cells in a row, you will realize that the data for the next cell can be found by moving over the length of the previous cell within the row's memory block. That is, if cell A1 is 5 bytes long, cell B1's control byte is the next byte after the 5 bytes of cell A1 (see Figure 1). If a cell is blank and unformatted, the control byte contains the number

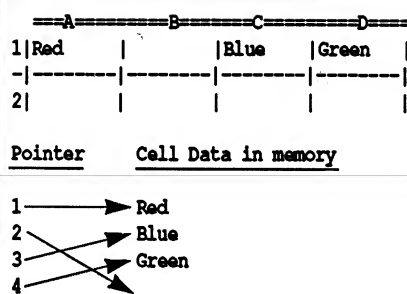


## Figure 2: Spreadsheet Cell Pointers

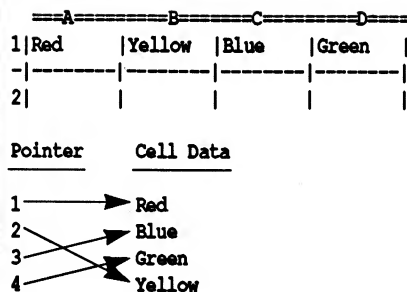
### Figure 2A: Initial State



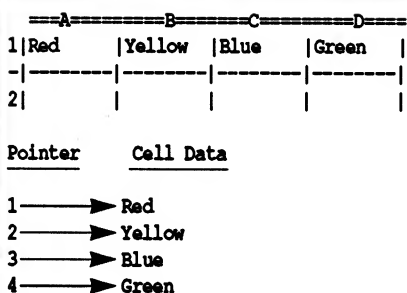
### Figure 2B: After Inserting a Column



### Figure 2C: After Adding Data but Before Saving to Desktop Memory



### Figure 2D: After Saving to Desktop Memory



of cells to skip. At first glance, it would not be easy to make an insertion in this type of structure because the data is tightly packed.

When you insert a column, the spreadsheet invokes a routine that creates a set of pointers to all of the cells in the first row of the spreadsheet. The program stores the pointers in a special work area. If a cell is blank, the pointer is zero. When you insert a column, AppleWorks moves the pointers for all the cells to the right of the newly-inserted column, and another routine copies the data back into a memory block based on the new pointer structure. AppleWorks saves the data in the memory block in cell order from left to right and adjusts the fixed cell references after you insert a column. The program repeats this process for every row in your spreadsheet. *Figures 2A, 2B, 2C, and 2D* depict the cell pointers before and after you insert a new column into the model. This model for one row is representative of all the rows.

The two routines that create and rearrange the table of pointers and data serve another purpose. AppleWorks stores the data for adjacent cells in a continuous string of bytes. Thus, there is only room to expand the data in the last cell in the row. There has to be a way to accommodate changes to any of the cells.

Whenever your changes to the contents of a cell increase or decrease the size of the associated data string, AppleWorks uses the column pointer routines to create a new set of pointers. It then replaces the original data in the memory block with the reorganized data based on the new pointers. This repacks the data so there are no wasted bytes and so the newly-lengthened cell will fit.

Note that AppleWorks does not assign a format definition to any cells in a newly created row or column; the new cells are always unprotected and use the standard spreadsheet format. You must remember to format the cells after you add a row or column to your model.

## Other Spreadsheet Data Structures

**Column Widths:** AppleWorks maintains a table of column widths which it alters when you



**Figure 3: Spreadsheet Recalculation**

**Figure 3A: No Cells Marked Changed**

	A	B	C	Col:	A	B	C	D	E	F	G	H
1	2	3 (A1+1)	4 (B1+1)		0	0	0	0	0	0	0	0
2	3	4 (A2+1)	5 (B2+1)									
3	4	5 (A3+1)	6 (B3+1)									
				Row:	1	2	3	4	5	6	7	8
					0	0	0	0	0	0	0	0

**Figure 3B: Cell A1 Changed**

	A	B	C	Col:	A	B	C	D	E	F	G	H
1	1	3 (A1+1)	4 (B1+1)		1	0	0	0	0	0	0	0
2	3	4 (A2+1)	5 (B2+1)									
3	4	5 (A3+1)	6 (B3+1)									
				Row:	1	2	3	4	5	6	7	8
					1	0	0	0	0	0	0	0

**Figure 3C: Final Calculations**

	A	B	C	Col:	A	B	C	D	E	F	G	H
1	1	2 (A1+1)	3 (B1+1)		1	1	1	0	0	0	0	0
2	3	4 (A2+1)	5 (B2+1)									
3	4	5 (A3+1)	6 (B3+1)									
				Row:	1	2	3	4	5	6	7	8
					1	0	0	0	0	0	0	0

change the width of a column. It is not part of the cell data structure; therefore every cell in the column must be the same width. It might be interesting to have a spreadsheet where a given column could vary its width depending on the row, but that would require a different approach to storing this data.

**Recalculation:** Early versions of AppleWorks recalculated every cell when you modified a cell containing a value. AppleWorks 2.1 and 3.0 dramatically enhance the speed of the recalculation process by recalculating only those cells the program needs to recalculate. Lissner accomplished this change by using a separate table to mark the cells that require recalculation. Whenever you add or change a cell, AppleWorks “marks” that cell in the table. When you recalculate the spreadsheet, AppleWorks checks to see if the current cell contains a cell reference. If it finds a reference, it

checks the table to determine if the referenced cell was changed. If so, it recalculates the cell and marks the newly recalculated cell in the table as “changed”. If the current cell does not contain a cell reference, AppleWorks moves to the next cell and repeats this process.

You may wonder where in AppleWorks there is room for a table for every possible cell in the spreadsheet. Remember that AppleWorks 3.0 offers as many as 9999 rows and 127 columns, for a total of 1,269,873 cells. At one byte each, that requires 1.2 megabytes of memory. Even if you used a bit scheme to compress 8 cells into 1 byte, this data would require 150K of RAM. But Lissner used a clever approach to store this data. Instead of storing each cell in a separate byte or bit, he used one byte for each column (thus supporting a maximum of 127 columns) and one for every possible row (999 or 9999, depending on your system). This approach requires only 10,126 bytes for large systems and 1,126 bytes for small systems.

If you change cell C3, AppleWorks puts a one in the table byte for column C and a one in the byte for row 3. If AppleWorks finds a reference to C3, it checks the table for a one in both the column and row byte. It recalculates the cell only if it finds a one in both locations. Unfortunately, this scheme occasionally tells AppleWorks to recalculate a cell that does not need recalculation; but these few anomalies do not impact the speed of AppleWorks.

Here are some examples of operations and their effect on the cell linkage table:

*Figure 3A* shows what happens when you recalculate a spreadsheet when no cells are marked as changed.

*Figure 3B* shows the table after the user changes the value in cell A1 but before AppleWorks does any calculations. Note the “1” in the table for column A and for row 1.

In *Figure 3C*, calculations proceeded through the bottom of column C. Note that AppleWorks now marks cells B1 and C1 as changed. The program



will then recalculate any cells that contain references to these cells. The program will not recalculate cells containing references to the cells in rows 2 and 3.

Remember that as I described last month, bit four in the third byte of a formula is also involved in the recalculation process. During the copying process AppleWorks checks this bit to ensure that every copied cell is recalculated.

### Hints and Tips

Once you understand the underlying data structures, you can start to make more efficient use of the space available for AppleWorks spreadsheet templates. Consider these hints and suggestions:

1. When you are running out of desktop memory, blank any formatted but unused cells. Formatted, unused numeric cells require ten bytes of memory; formatted, unused label cells use two bytes. But there is more to the amount of memory required by each cell. You will recall from Randy Brandt's article on memory management that the more memory in your computer, the less efficiently AppleWorks uses that memory. For example, a system with lots of memory can have a block size as large as 64 bytes. That means that every spreadsheet row containing a formatted but unused cell wastes 64 bytes of desktop memory.
2. If it is feasible, do your formatting by row or by column and not by block. Row and column layouts are "smart", that is, they will not format a cell that does not contain data. Block layouts will format every cell in the block, whether or not it contains data. When you format by block, you could create a number of formatted but otherwise empty cells which use desktop memory.
3. If you run out of room in a formula that contains numbers, put the number in another cell and change the formula to reference that cell. For example, if the formula is  $+B3*2$ , put the "2" in cell A1 and change the formula to  $+B3*A1$ . That will give you five extra bytes by replacing the 8-byte SANE number with a 3-byte cell reference. Note, however, that this approach increases your total memory require-

ment. In addition, the formula will take longer to recalculate because the number "2" must be obtained by reference.

### Conclusion

Once you understand AppleWorks' spreadsheet data structure, it becomes apparent how a carefully designed data structure can contribute to the module's speed and operation. Understanding the data structure should help you make more effective use of AppleWorks and suggests more efficient ways to develop your models.

*[The author thanks Rob Renstrom for his technical assistance with the recalculation section of this article. Mr. Renstrom authored the spreadsheet enhancements in AppleWorks 3.0.]*

*[Dan Verkade is the developer of TimeOut Report-Writer, DoubleData, and other popular AppleWorks enhancements.]*

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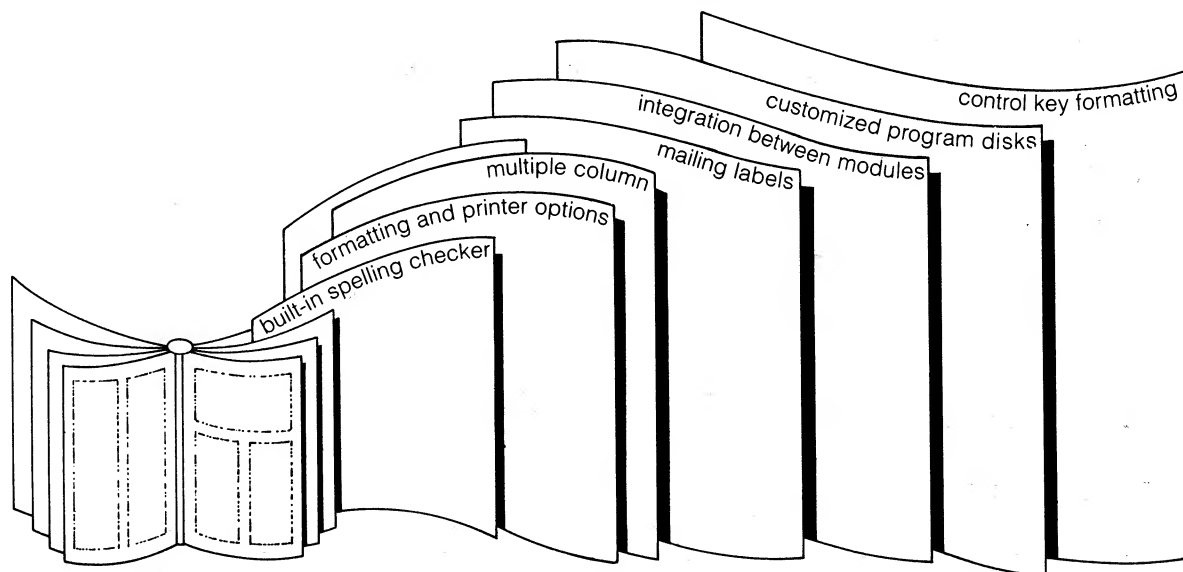
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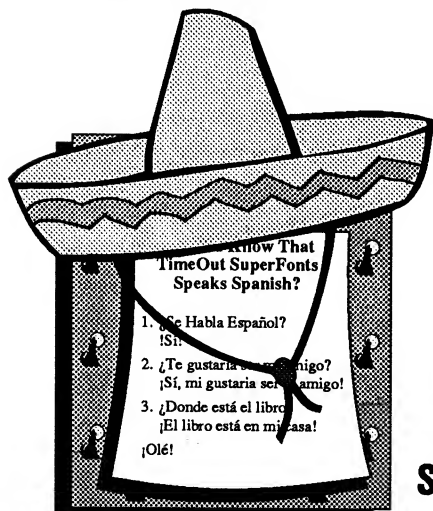
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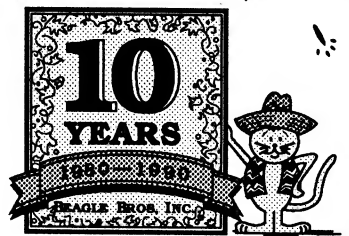
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# Late News and Special Offers for NAUG Members

## NAUG

NAUG recently assumed responsibility for developing and distributing 1040Works, a set of professionally prepared AppleWorks spreadsheet templates that compute your Federal Income Tax. 1040Works handles 21 different forms and schedules including Forms 1040, 2106 (Employee Expenses), 2114, 2119 (Sale of Residence), 2441 (Child Care Expenses), 3903 (Moving Expenses), 4562 (Depreciation), 6251 (Alternative Minimum Tax), 8582 (Passive Loss Limitation), 8582-CR (Passive Activity Credit), 8606 (Nondeductible IRA Contributions), 8615 (Children's Tax Computations), and 8814 (Parent's Election to Report Child's Interest and Dividends). 1040Works also prepares IRS-accepted printouts of 1040 Schedules A, B, C, D, E, F, R, and SE.

A positive review of 1040Works appeared in the March 1988 issue of the *AppleWorks Forum*. AppleWorks developer Dan Verkade updated the 1040Works templates to comply with the 1990 tax laws. Phineas Fiske, the originator of 1040Works, and Warren Williams, NAUG's President, served as consultants on the project.

1040Works comes in two versions. Standard 1040Works is compatible with all versions of AppleWorks and requires 128K or more of RAM. 1040Works-X more closely integrates the templates, requires at least 256K of RAM and AppleWorks 2.0 or later. The 1990 versions of 1040Works and 1040Works-X include a run-time version of TimeOut UltraMacros; you do not need a macro program to use the excellent macros on these disks.

1040Works and 1040Works-X cost \$29.95 plus \$3 s/h. NAUG members receive a \$3 discount; please include your membership number with your order. Owners of earlier versions of 1040Works can update to the 1990 package for \$19.95 plus \$3 s/h. NAUG will send all registered owners of 1040Works a form they must use to order the update. (Note: The NAUG discount only applies to the full price of

1040Works; not to the discounted renewal price.) NAUG will ship the 1990 versions of 1040Works and 1040Works-X on February 15, 1991.

NAUG can now supply reprints of three articles that appeared in the current issue of Apple Computer's *Education Technical Bulletin*. "Troubleshooting a LocalTalk or Macintosh-Based Network" is an 11-page article that describes how to identify the source of problems on AppleTalk networks. For a copy of this article, send \$2 and a self-addressed, #10 envelope with 52 cents postage to "Network Article", NAUG, Box 87453, Canton, Michigan 48187.

"AppleTalk on the Apple II Workstation" is a 6-page article that describes AppleTalk protocols and other items of interest to users of Apple II computers connected to an AppleTalk network. For a copy, send \$1 and a self-addressed, stamped, #10 envelope to "AppleTalk" at the NAUG address.

"Apple IIGs: Apple Access II Setup and Startup Issues" describes how to run Apple Computer's Apple Access II communications program on Apple IIGs computers. Copies of this 2-page article are free to members who send a self-addressed, stamped, #10 envelope to "Apple Access II Setup" at the NAUG address.

NAUG members can now use the Electronic Forum, NAUG's free AppleWorks bulletin board service, to renew their membership and place orders. To use this service, call the Electronic Forum at (313) 736-8102, go to the Other Activities Menu, and select NAUG On-Line Ordering. Prompts will guide you through the ordering process. [NAUG, Box 87453, Canton, Michigan 48187; (313) 454-1115.]

## A2 Central

A2 Central announced the untimely death of AppleWorks expert and long-time NAUG supporter Richard Marchiafava, editor of the company's bi-monthly TimeOut Central disk. AppleWorks and UltraMacros developer Randy Brandt has assumed



editorial responsibility for this publication. [A2 Central, Box 11250, Overland Park, Kansas 66207; (913) 469-6502.]

## Apple Computer

Apple Computer recently released GS/OS 5.0.4, a maintenance update of the company's Apple IIGS operating system. Version 5.0.4 fixes some bugs in 5.0.3, including a bug that occasionally locks up the computer when you print from AppleWorks GS and other 16-bit programs on IIGS computers with limited memory. GS/OS 5.0.4 is functionally equivalent to version 5.0.3; all articles in last month's issue of the *AppleWorks Forum* pertaining to GS/OS 5.0.3 apply to the new version of this operating system.

NAUG members can get GS/OS 5.0.4 from NAUG's Public Domain Library. The system comes on two 3.5-inch disks and costs \$12 plus \$2 s/h. See the article entitled "How to Install GS/OS 5.0.3" in last month's issue of the *AppleWorks Forum* for step-by-step installation instructions. NAUG members with Vulcan internal hard drives need a customized version of GS/OS 5.0.4 that is available from Applied Engineering.

Apple Computer recently announced HyperCard IIGS, an Apple IIGS-compatible, color version of the company's popular Macintosh HyperCard program. HyperCard IIGS works like a set of index cards that let you store documents and graphics in "stacks". Buttons on the cards let you link cards and stacks.

The HyperCard IIGS package includes pre-programmed Address, Calendar, Story Board, Help, and Tutorial stacks. The package also includes HyperTalk, HyperCard's powerful English-like scripting language that lets you create personalized stacks and cards. Apple Computer's new HyperMover program lets you use a Macintosh computer to convert Macintosh HyperCard 1.2.2 and 1.2.5 stacks into HyperCard IIGS-compatible stacks. HyperCard IIGS is not directly compatible with version 2.0 of Apple's Macintosh HyperCard program.

HyperCard IIGS requires at least 1.5-megabytes of RAM (2-megabytes recommended), one 3.5-inch disk drive and a hard disk or a network environment, and GS/OS 5.0.4 or later. HyperCard IIGS will be available from authorized Apple dealers in mid-

February and has a suggested retail price of \$99.

NAUG members who work with computer clubs or who teach computer classes should write for three free publications produced by Apple. The 24-page *Apple Computer Clubs Handbook* suggests ways to help you organize and run a club and includes ways to publicize your activities and ideas to help you get funding. The 50-page *Apple Computer Clubs Activity Plan Book* describes more than a dozen significant projects and ideas you can use with your students. Apple's *User Group Information Pack* contains all the information you need to start and sustain a user group, including Apple's valuable 84-page guide entitled *Just Add Water*.

For copies of these free publications, write to "NAUG Member, Ms. Dee Anne Dougherty, K-12 Education Marketing Specialist, User Group Connection, Apple Computer, Inc., 20525 Mariani Avenue, Cupertino, California 95014". Also identify yourself as a NAUG member and mention the *AppleWorks Forum* in your note to Apple.

## ISTE

The International Society for Technology in Education (ISTE) publishes *The Computing Teacher*, the *Journal of Research on Computing in Education*, and numerous workbooks, handbooks, programs, and other items of interest to computer-using educators.

Of special interest to NAUG members is Linda Rathje's *AppleWorks for Educators - A Beginning and Intermediate Workbook*, a 400+ page workbook that includes 39 instructional activities and an AppleWorks data disk designed to help teachers and students learn AppleWorks. The book also includes 80-pages of articles about AppleWorks and productivity software that originally appeared in *The Computing Teacher*.

The AppleWorks 3.0 version of *AppleWorks for Educators* usually costs \$26.95; the AppleWorks 2.0 version of the book usually costs \$22.95. However, until May 1, 1991, NAUG members can buy these books directly from ISTE for \$20.20 and \$17.20 respectively, plus \$4.50 s/h. Mention this special NAUG offer when you order and indicate this is a "Code 9" order when you call or write.



Also request a copy of the Society's free catalog of products of interest to educators. [*ISTE, 1787 Agate Street, Eugene, Oregon 97403; (503) 346-4414.*]

## JEM Software

JEM Software recently released FlexiCal 1.4, an enhanced version of JEM's personal and business scheduling program. FlexiCal 1.4 automatically puts the cursor at the current date and easily transfers data from one weekly calendar to the next. The new version of FlexiCal also follows the traditional calendar pattern of splitting dates in months spread over six different weeks. A favorable review of FlexiCal appeared in the June 1990 issue of the *AppleWorks Forum*. The retail price of FlexiCal remains unchanged at \$30 plus \$2 s/h.

PathFinder is Randy Brandt's utility that makes it easy to change the current pathname, delete empty subdirectories, and rename, lock and unlock files from within AppleWorks. PathFinder usually sells for \$20. Until March 31, NAUG members can get both FlexiCal 1.4 and PathFinder for \$35 (plus \$4 s/h) directly from JEM.

To qualify for this special offer, you must provide your NAUG membership number from the back of this issue of the *AppleWorks Forum*. JEM accepts Visa and MasterCard, but waives the \$2 per item shipping and handling charge for all orders paid by check or money order.

NAUG members who own FlexiCal can get updates to the version 1.4 from Bruce Shanker, 1279 Boyd Road, Warminster, Pennsylvania 18974-2260. Send Bruce your original disk(s) and payment of \$4 for a 3.5-inch disk, or \$3.50 for a 5.25-inch disk. Non-members can get updates directly from JEM for \$5 per disk. [*JEM Software, 7578 Lamar Court, Arvada, Colorado 80003. Orders only: (313) 422-4856.*]

## Quality Computers

Quality Computers recently announced the release of SuperPatchNet, John Link's new patch program for the network version of AppleWorks 3.0. SuperPatchNet installs more than 40 patches in AppleWorks including five "defensive" patches that keep students from deleting files, creating subdirectories, and otherwise wreaking havoc on the file server.

Other SuperPatchNet patches add a clock to the AppleWorks screen, provide continuous display of available desktop space, correct errors in the AppleWorks word processor Help Screen, automatically enter the date in data base and spreadsheet reports, and add other enhancements to the network version of AppleWorks. SuperPatchNet costs \$79.95.

Quality also announced that until April 1, NAUG members who buy a QC Hard Drive will receive a free copy of Quality's Easy Drive disk management and utility program. Easy Drive, which makes it easy to launch applications and manage a hard drive, usually costs \$39.95.

Quality offers two size QC drives, both of which use fast, reliable, and quiet Conner mechanisms. The 40-megabyte drive costs \$599.95. Quality recently reduced the price of the 100-megabyte unit to \$849.95. Prices include complete documentation and an Apple High Speed SCSI card.

Identify yourself as a NAUG member and request your free copy of Easy Drive when you place your order. [*Quality Computers, Box 665, St. Clair Shores, Michigan 48080; (800) 443-6697.*]

## S. A. AuTeur

EuroWorks is an AppleWorks enhancement that lets you print French, German, Italian, Portuguese, and Spanish characters from AppleWorks. Once you install EuroWorks on your working copy of AppleWorks, you enter accented foreign characters by typing the character followed by its accent. EuroWorks inserts the accented foreign character in your printout. A favorable review of EuroWorks appears in this month's issue of *inCider/A+ Magazine*.

EuroWorks requires AppleWorks 2.0 or later and an ImageWriter I, II, or LQ, Mannesmann Tally MT 85 or 86, or Seikosha SP-1000AP printer.

The French and Spanish versions of EuroWorks regularly sell for \$24; the five-language version usually costs \$39. Until May 1, NAUG members can get the French or Spanish version of the program for \$19 and the five-language version for \$31. All prices include shipping. Order directly from the company; identify yourself as a NAUG member and include your NAUG membership number when you place your order. Also indicate whether you



want the French, Spanish, or five-language version of the program and whether you use AppleWorks 2.0, 2.1, or 3.0. [*S. A. AuTeur Company, Box 7459, Beaverton, Oregon 97007; (503) 645-2306.*]

## Seven Hills Software

Seven Hills Software recently announced the release of SuperConvert, a graphics conversion package for Apple IIGS computers. SuperConvert converts graphics stored in any one of 32 different Apple II, Macintosh, IBM, Atari ST, Amiga, and Commodore 64/128 formats into formats that can be read by most Apple II and Apple IIGS graphic programs. Note, however, that the original file must be on a ProDOS-formatted disk to use SuperConvert. Thus, SuperConvert can handle graphic files you download from electronic services or files that you transferred to your IIGS with a modem. You can also use SuperConvert to convert Macintosh files you translated onto ProDOS disks using the Apple File Exchange program or from MS-DOS files you transferred with Cross-Works.

SuperConvert, which requires an Apple IIGS with at least 1-megabyte of RAM and at least one 3.5-inch disk drive, normally sells for \$39.95. However, until March 31, 1991, NAUG members can buy SuperConvert directly from Seven Hills for \$20 plus \$3 s/h. You must mention this NAUG offer and provide your NAUG membership number when you contact the company. [*Seven Hills Software, 2310 Oxford Road, Tallahassee, Florida 32304; (800) 627-3836. Outside the U.S.: (904) 575-0566.*]

## SoftSpoken

Cross-Works is a dedicated utility program that makes it easy to transfer AppleWorks files to and from MS-DOS computers. Cross-Works automatically transfers your data between computers and converts the data formats so your AppleWorks files are compatible with Microsoft Works, WordPerfect, Lotus 1-2-3, dBase and other popular MS-DOS programs. A favorable review of Cross-Works appeared in the May 1989 issue of the *AppleWorks Forum* and NAUG believes this is a valuable utility program for anyone who works in both the AppleWorks and MS-DOS environments. Cross-Works lists for \$99.95 and includes 5.25-inch

and 3.5-inch disks for both the Apple and MS-DOS computer, a manual, and a universal cable to connect the serial ports of an Apple IIe, IIC, IIC Plus, or IIGS to an IBM PC, XT, AT, PS/2, or compatible computer. Until April 1, 1991, NAUG members can buy Cross-Works for \$59.95 from Quality Computers at (800) 443-6697. You must identify yourself as a NAUG member and provide your NAUG membership number from your address label on this issue of the *AppleWorks Forum*. [*SoftSpoken, Inc., Box 18343, Raleigh, North Carolina 27619-8343; (919) 870-5694.*]

## WestCode Software

WestCode is now shipping InWords, the company's optical character recognition software for Apple II systems. InWords comes pre-trained to recognize the typefaces used in the *AppleWorks Forum*, A2 Central, BusinessWeek, Forbes, Fortune, Money, Newsweek, The Atlantic Monthly, Time, and US News and World Report.

InWords uses fonts tables to store a description of all the fonts used in each publication; each table includes a number of different fonts and font families. You select the appropriate fonts table for the document you want to scan from the InWords Fonts Menu.

Each time you train InWords for a different publication, you automatically create a fonts table. Although InWords is a copyrighted program, the data files containing your fonts tables are not protected by copyright; WestCode encourages users to share their work. NAUG's Public Domain Library will serve as a clearing house for these files. Thus NAUG members will be able to use files created by others rather than repeating the training process. Please submit your disks containing one or more InWords fonts tables to InWords Fonts Tables, NAUG, Box 87453, Canton, Michigan 48187. Include the name of the publications read by each file on the disk. NAUG will distribute collections of fonts tables through its Public Domain Library and will upload these files to the Electronic Forum and the NAUG areas on CompuServe, America Online, and GENIE. [*WestCode Software, 11835 Carmel Mountain Road, Suite 1304, San Diego, California 92128; (619) 679-9200.*]



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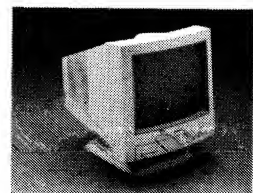
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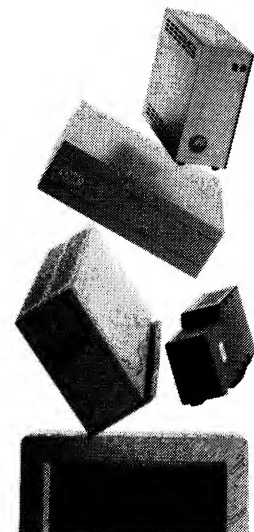
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# Make It Easier to Produce Special Characters

by Keith Johnson

One of the features of TimeOut SuperFonts is its ability to print characters that do not appear on the Apple II keyboard. You produce these characters by entering a set of codes that tell SuperFonts to switch to an alternate character set, print the character, and then switch back to the normal set. For example, with most fonts, the codes "<x2>V<x1>" produces a Spanish "ñ". [Ed: See the article entitled "Use SuperFonts to Print Special Characters" in the October 1988 issue of the AppleWorks Forum.]

It can be difficult to remember and enter all the necessary keystrokes required to produce each special character, but Lance Chilton of Albuquerque, New Mexico, wrote a macro that automatically enters the codes that produce these characters. Figure 1 contains the macro; Figure 2 lists the keystrokes that produce each special character. [Ed: These macros use the "~" keystroke which is on the same key as the tilde (~).]

**Figure 1: Macros that Produce Special Characters**

```
:<asr :                                { Define subroutine; must be before the main macro. }
oa-1 :                                { Jump to the beginning of the file.      }
oa-R>t<oa-Y :                          { Tell AppleWorks to replace text.      }
print $1 : rtn :                      { Replace the text in variable $1.      }
oa-Y : print "<x2>" + $2 + "<x1>" : { Replace with the appropriate character. }
rtn>a!                                { Tell Replace Command to do them all.  }
```

```
:<awp :                                { Define the main macro.                }
$1 = "a~" : $2 = "J" : sa~ :          { Handle umlauts/tremas.              }
$1 = "e~" : $2 = "Q" : sa~ :
$1 = "o~" : $2 = "Z" : sa~ :
$1 = "u~" : $2 = "_" : sa~ :
$1 = "a^" : $2 = "G" : sa~ :          { Handle accents aigus.                }
$1 = "e^" : $2 = "N" : sa~ :
$1 = "i^" : $2 = "R" : sa~ :
$1 = "o^" : $2 = "W" : sa~ :
$1 = "u^" : $2 = "\" : sa~ :
$1 = "a`" : $2 = "H" : sa~ :          { Handle accents graves.                }
$1 = "e`" : $2 = "O" : sa~ :
$1 = "i`" : $2 = "S" : sa~ :
$1 = "o`" : $2 = "X" : sa~ :
$1 = "u`" : $2 = "]" : sa~ :
$1 = "a^" : $2 = "I" : sa~ :          { Handle accents circonflex.            }
$1 = "e^" : $2 = "P" : sa~ :
$1 = "i^" : $2 = "T" : sa~ :
$1 = "o^" : $2 = "Y" : sa~ :
$1 = "u^" : $2 = "^" : sa~ :
$1 = "n~" : $2 = "V" : sa~ :          { Handle tilde and other characters.    }
$1 = "c~" : $2 = "M" : sa~ :
$1 = "a@" : $2 = "L" : sa~ :
$1 = "[deg]" : $2 = "a" : sa~>!      { A bonus: Replace [deg] with °.        }
```

## Preparing the Document

To prepare a document, you enter the special character *after* the letter over which you want it to appear. For example, you would enter "n~" when you want a Spanish "ñ". After you type the complete document, you press <sa-~>. The macro goes through your document and uses AppleWorks'



**Figure 2: Special Characters**

The left-hand column of characters depicts what you type and see on the screen. The right-hand column shows the character that appears in your output after running the macro and printing with SuperFonts.

## Umlauts (tremas)

a~	ä
e~	ë
o~	ö
u~	ü

## Accents Aigus (acute accents)

a"	á
e"	é
i"	í
o"	ó
u"	ú

## Accents grave

a`	à
e`	è
i`	ì
o`	ò
u`	ù

## Accents circonflex (circumflexes)

a^	â
e^	ê
i^	î
o^	ô
u^	û

## Tilde and other characters

n~	ñ
c~	ç
a@	à

## And a bonus... [deg]

	°
--	---

Replace Command to substitute the SuperFonts code "<x2>V<x1>" for "n~".

## Using Subroutines

This macro stores the characters "a~" in variable \$1 and the corresponding character from the first alternate character set (the letter "J") in variable \$2. It then calls the <sa-`> subroutine that replaces all occurrences of a~ with <x2>J<x1>. UltraMacros then returns to the main macro which stores the characters "e~" in \$1 and the letter "Q" in \$2 and repeats the search and replace operation.

As with any well-designed program, all the repetitive activities occur in a subroutine that takes responsibility for the cursor movement and Replace Command activities. That eliminates the need to include these commands in each line of the macro. [Ed: For more information about subroutines, see the article entitled "How to Use Subroutines to Simplify Macros" in the July 1989 issue of the AppleWorks Forum.]

Dr. Chilton uses UltraMacros 3.x's <asr> token to define the subroutine macro; you cannot call an <asr> macro from the keyboard. This feature is not available in earlier versions of UltraMacros which did not differentiate between keyboard and subroutine macros.

Note that Dr. Chilton designed this macro as a "post-processor". Although he could have defined a keystroke to produce each character directly from the keyboard, that would enter all the SuperFonts codes into the original document and would make the document difficult to read and edit on the screen. His approach lets you create and save highly readable documents and then use the macro to enter the SuperFonts codes. You don't need to save the document in its new, unreadable form.

## Enhancing the Macro

You can probably think of ways to enhance the power of Dr. Chilton's macro. For example, the macro only manipulates lower-case characters. You can easily add upper-case characters or special characters such as ¶ or § to the list. Some special characters are in the second alternate character set (set x3); you will have to revise the macro to address those characters.

Remember to choose your codes carefully; you must avoid character combinations that can occur naturally in a document. For example, if you represent the trema/umlaut (ö) by quotation marks, the code o" might occur naturally in a document and produce undesirable results.

Finally, you might want to define more than one main macro. For example, why not develop a macro that substitutes left and right curved quotation marks for the usual quotation mark characters? This poses an interesting programming challenge because you will want the macro to differentiate between beginning and ending quotes. Give it a try. If you come up with a solution, send it to me at NAUG. And let me know about other applications you develop that use techniques you learned from Dr. Chilton's macro. ■

[Keith Johnson is Associate Director of the Fleischmann Planetarium at the University of Nevada, Reno. Dr. Lance Chilton is a pediatrician in Albuquerque, New Mexico.]



# We don't recommend plucking your Vulcan™ off a table and dragging it along the ground.

## But it's nice to know you could.

October 30, 1990

Gentlemen:

*I use my Apple IIGS with a Vulcan and an AE A/D converter at professional waterski tournaments to measure jump distances. I wish to commend you on the durability of your Vulcan Hard Drive.*

*I was using the computer at the U.S. National Waterski Championships in August when a gust of wind picked up the canopy under which we were operating. Wires running to my system were attached to the canopy and when the canopy blew away, it pulled the computer with the Vulcan off the table and onto the ground, dragging it along the ground some twenty feet. I was actually in the process of writing data to the hard disk at the time.*

*Even though the incident pulled many of the attaching wires out of the computer, no damage occurred to the computer or the hard drive. I subsequently verified all of the data on the hard drive and found no errors and no bad or damaged blocks in either ProDOS or MS-DOS (I use half my storage for my PC Transporter's MS-DOS files and half for ProDOS).*

*Needless to say, I am very grateful for a soundly built and well-engineered product.*

*Sincerely yours,  
Roger Dilling  
Milledgeville, Georgia*

We hope you never drag your hard disk through the dirt, but can appreciate the engineering required to make the above letter possible. Until recently, if you wanted a hard disk for your Apple, you had to add an outdated, boxy external to your desktop clutter. Now, with Vulcan™ on the scene, you have an internal to consider. One that's lightning fast, clean, powerful and affordable.

A glance at the other computer manufacturers; IBM, Compaq, Dell, Mac, tells

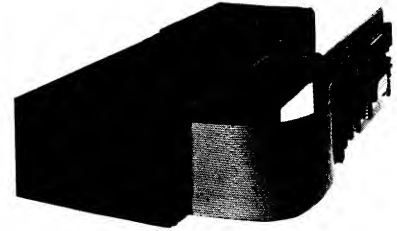
you something. They're all very different systems, but all come with internal hard disks (it's hard to even find a Mac these days without an internal hard disk). The reason? Internals are the latest advance. The modern storage solution. They become a transparent part of your system, and in the case of Vulcan, actually enhance the rest of your system.

**Enhancing the rest of your system.** Many feel Apple's standard power supply is insufficient. Add a Vulcan and you make a significant improvement to the rest of your system. The high efficiency power supply in Vulcan is rated in excess of 70 watts, nearly double the capacity of Apple's standard power supply and that of other drives. Vulcan power supply components are heatsinked to the aluminum case for cool operation and long life. And we added an ultra-quiet, flush-mounted cooling fan to keep things cool inside. Vulcan actually beefs up your power supply. External hard disks drain it.

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**Incider/A+ Magazine put it simply** in their "Best of the Best" Holiday Shopping Guide: "*The best internal hard disk is the Vulcan from Applied Engineering - you can use it with DOS 3.3, ProDOS or GS/OS, and it comes with its own fan and power supply*". Vulcan incorporates the most popular standard protocols for a hard disk and includes an ultra-fast 16-bit data bus controller, not

the less expensive 8-bit others use. And since Vulcan is fully compatible with our PC Transporter, you can create ProDOS or MS-DOS storage space, in addition to GS/OS, DOS 3.3, CP/AM or Pascal 1.3. No



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# How to Delete Subdirectories

by Randy Brandt

If you ever tried to use AppleWorks to delete a subdirectory from a data disk, you know that the process can be frustrating at best. Here's a trick that lets you use AppleWorks to delete a subdirectory from a disk:

1. Delete all the files from the subdirectory. (ProDOS only lets you delete an empty subdirectory; that protects you from inadvertently deleting important files from the disk. Copy II+ and the Finder let you delete a subdirectory and all the files within that subdirectory in a single operation. Most other disk utility programs, including TimeOut FileMaster and JEM Software's PathFinder, only delete empty subdirectories. However, PathFinder makes it easier to delete empty subdirectories from within AppleWorks. You invoke PathFinder, select "Delete a subdirectory", and choose the subdirectory you want to delete from a list.)
2. Go to the Other Activities Menu and select choice #4, "Delete files from disk" and press the Return Key.
3. Navigate through the subdirectories to the level that contains the subdirectory folder. (This is one level *above* the actual subdirectory you want to delete.) Press the Return Key.

For example, if the path to subdirectory /C is /A/B/C, you would set the path to /A/B and

**Figure 1: Subdirectory Listed in Disk Catalog**

Disk: Disk 1 (Slot 2)      DELETE FILES      Escape: Other Activities

---

Main Menu

Other Activities

Delete Files  
Disk volume /FEB has 678K available

Name	Type of file	Size	Date	Time
DAVE.1	Word Processor	11K	12/15/90	11:07 am
DAVE.2	Word Processor	9K	12/17/90	9:34 pm
EVE.3.1.90	Word Processor	2K	12/15/90	5:53 pm
EVE.4.12.90	Word Processor	3K	12/15/90	10:07 am
MIKE.1.10.90	Word Processor	2K	12/17/90	10:36 am
MIKE.3.3.90	Word Processor	20K	12/17/90	3:26 pm
NAN.5.12.90	Word Processor	23K	12/16/90	5:51 pm
NIKE.6.18.90	Text	1K	12/12/90	10:43 pm
POLAROID.1	Text	7K	12/12/90	10:41 pm
SUB.1	Subdirectory	1K	12/17/90	6:49 am

---

Use Right Arrow to choose files, Left Arrow to undo      ⌘-? for Help

press the Return Key. The subdirectory listing must be in the catalog on the screen, like the listing that contains subdirectory SUB.1 in *Figure 1*.

4. Enter an Apple-Right-Arrow to select all the files and subdirectories in the catalog.
5. Use the Left-Arrow Key to de-select all the files and subdirectories you do *not* want to delete.
6. Press the Return Key to delete the subdirectory.

*[Randy Brandt, an author of AppleWorks 3.0, is the owner of JEM Software, publishers of AppleWorks enhancements such as DoubleData and FlexiCal. He is also the developer of TimeOut UltraMacros and many other TimeOut modules.]*



# How to Use ReportWriter's Numeric Functions

Dan Verkade

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*This is the eighth in a series of articles that describe how to use TimeOut ReportWriter to enhance the power of AppleWorks. The author assumes that you read the previous articles in this series.*

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This month's ReportWriter Tutorial will teach you how to use ReportWriter's numeric functions and how to integrate data from AppleWorks data base and spreadsheet files into a single ReportWriter report.

## Numeric Functions

ReportWriter offers two sets of numeric functions. One set operates on each record in the master file and is used in either the body or work area of a report. The second set of functions are summary functions that operate within ReportWriter to provide subtotals, totals, and other calculations. These functions summarize data printed in the report.

This month I will describe how to use the first of these two sets of functions; the functions that operate on each record. A brief description of these functions follows:

**@ABS(Number):** Returns the absolute value of a number. @ABS changes a negative number to a positive number but does not affect positive numbers. For example, the absolute value of -25 is 25; the absolute value of 25 is also 25.

You can use @ABS to calculate discounts on quantities of items sold and returned. For example, consider the following table that computes the percent discount for a customer who purchased 150 items and got a credit for 100 returned items (the discount formula in this example is  $100 * (1 - (\text{Wholesale}/\text{Retail}))$ ):

Quantity Sold	Unit Price	Retail Price	Wholesale Price	Percent Discount
150	12	1800	1000	44.44%
-100	12	-1200	800	166.67%

The 166.67% discount on the returned items is incorrect and is caused by the negative number in the calculation. The correct formula for this calculation is  $100 * (1 - @ABS(\text{Wholesale}/\text{Retail}))$ , which yields the following results:

Quantity Sold	Unit Price	Retail Price	Wholesale Price	Percent Discount
150	12	1800	1000	44.44%
-100	12	-1200	800	33.33%

**@INT(Number):** Returns the integer portion of a number and truncates everything to the right of the decimal point. For example, @INT(1.25) returns "1". @INT(2.98) returns "2".  $1 + @INT(\text{Weight})$  will print the weight of every item rounded to the next highest pound.

You use @INT whenever you want to ignore the fractional part of a number. For example, you can use the formula @INT(DaysOverdue/30) to convert days overdue into whole months as follows:

Days Overdue	Months Overdue
10	0
38	1
99	3

**@INV(Number):** Reverses the sign of a number; negative numbers become positive and positive numbers become negative. For example, @INV(-248) returns "248"; @INV(248) returns "-248". @INV(Withdrawal) will print every withdrawal as a positive number. @INV lets you display a number in one sign and preserve the opposite sign for additional calculations.

**@FRAC(Number):** Returns the fractional portion of a number; the part of the number that is to the right of the decimal point. @FRAC(4.125) returns



**Figure 1: Calculations with @RND**

Price	Tax Rate	Calculated Tax	Displayed Tax	Correct Tax
\$111.10	.06	6.6666666666666666	6.67	6.67
111.10	.06	6.6666666666666666	6.67	6.67
111.10	.06	6.6666666666666666	6.67	6.67
		19.99999999998	20.00	20.01

cell. One number, the underlying calculated value for the cell, is determined using SANE, the Standard Apple Numeric Environment. The other value is the displayed number which is formatted to the specifications you define.

ReportWriter handles calculated and displayed values in a similar fashion. That is, the program uses SANE to compute underlying

values, but prints numbers in the format you specify. You change the precision of the printed number by defining the number of decimal places you print, thus leaving the true precision unchanged and available for additional calculations.

Unfortunately, differences between displayed and underlying numbers can cause problems. For example, consider the tax calculations that appear in *Figure 1*. Your computer uses SANE to compute the "Calculated Tax" to 15 or 16 decimal places. However, if you print the output with two decimal places, you get the results that appear in the "Displayed Tax" column. The Displayed Tax column sums incorrectly; the correct sum appears in the "Correct Tax" column. ReportWriter's rounding functions let you change the underlying precision of the Calculated Tax and thus produce the Correct Tax column.

ReportWriter offers three rounding functions:

**@RND(Number1,Number2):** @RND rounds Number1 to the number of decimal places specified by Number2. For example, @RND(123.456,2) returns "123.46". I used the formula @RND(Price\*TaxRate,2) to generate the "Correct Tax" entries in *Figure 1*.

@RND rounds the number 1.23456 as follows:

```
@RND (1.23456,1) = 1.2
@RND (1.23456,2) = 1.23
@RND (1.23456,3) = 1.235
@RND (1.23456,4) = 1.2346
@RND (1.23456,5) = 1.23456
```

**@RNDDOWN(Number1,Number2):** @RNDDOWN is similar to @RND, but always rounds the number down. For example, the number 1.23456 rounds down as follows:

".125". Please write to me at NAUG if you can think of a good use for this function; I have never used it in any of the reports I have written.

**@MAX(Number1,Number2):** Returns the larger of Number1 or Number2. For example, @MAX(10,12) returns "12". Note that unlike the @MAX function in the spreadsheet which can accept a list or range of values, ReportWriter's @MAX only accepts two numbers or variables. @MAX(Grade,Average) will print each student's grade or average, whichever is higher.

**@MIN(Number1,Number2):** Returns the smaller of Number1 or Number2. For example, @MIN(10,12) returns "10". @MIN(Shipping,8.00) will print whichever is less, the actual shipping charge or \$8.00.

**@PAGENO(DummyNumber):** Returns the page number currently being printed by ReportWriter. You can use @PAGENO to print each page number by putting "Page @PAGENO(1)" anywhere in a ReportWriter report definition.

The argument DummyNumber is required but has no meaning; ReportWriter returns the correct page number no matter what number you enter for DummyNumber. Please don't ask me why I required DummyNumber when you use this function; I must have had a reason when I did it.

**@SQRT(Number):** Returns the square root of Number. For example, @SQRT(25) returns "5". You can compute the hypotenuse of a series of right triangles with the formula @SQRT((Width\*Width)+(Height\*Height)).

## Rounding Functions

You probably know that spreadsheet programs keep track of two different values for each numeric



**Figure 2: Sample Reports**

Quarterly Results ABC High School Chemistry						
Student Name	Code	Class	Tests	HomeWork	Lab	Total
Anderson	FR	Freshman	198	270	289	757
Burton	SE	Senior	172	265	226	663
Calhoun	JR	Junior	161	233	225	619
Danielson	SE	Senior	166	233	233	632
Edmundson	SO	Sophomore	200	294	237	731
Franklin	SO	Sophomore	200	282	285	767
Grayson	SE	Senior	149	209	201	559
Harrison	JR	Junior	205	226	286	717
Ingraham	FR	Freshman	156	225	277	658
Jackson	SE	Senior	204	231	295	730
Kerr	JR	Junior	171	261	295	727

**Figure 3: ReportWriter Screen for ClassScores**

```

File: ClassScores
EDITOR
Escape: Main Menu

Quarterly Results
ABC High School
Chemistry

Student Name  Code  Class  Tests  HomeWork  Lab  Total
-----
*****  **  *****  *****  *****  *****  *****
*

Type entry or use ^ commands
Row: 1 Col: 1 ^-? for Help

```

@RNDOWN (1.23456,1) = 1.2  
 @RNDOWN (1.23456,2) = 1.23  
 @RNDOWN (1.23456,3) = 1.234  
 @RNDOWN (1.23456,4) = 1.2345  
 @RNDOWN (1.23456,5) = 1.23456

**@RNDUP(Number1,Number2):** @RNDUP rounds the number up. For example, 1.23456 rounds up as follows:

@RNDUP (1.23456,1) = 1.3  
 @RNDUP (1.23456,2) = 1.24  
 @RNDUP (1.23456,3) = 1.235  
 @RNDUP (1.23456,4) = 1.2346  
 @RNDUP (1.23456,5) = 1.23456

## Other Functions

A number of ReportWriter functions can manipulate either text or numbers as long as you do not

mix text and numbers in the same operation. Consider the following:

**@CHOOSE(Number,ListItem1,List-Item2,ListItem...):** @CHOOSE returns the ListItem that corresponds to the value of Number. For example, @CHOOSE(Grade,"A","B","C","D","F") returns "B" in records where the Grade category contains the value of "2".

You can also use @CHOOSE to print data from other fields. For example, you can define 12 fields in the work area named M1, M2,...M12, each containing a month of the year spelled out. M1 contains "January", M2, "February", and so forth. Then ReportWriter can use the formula @CHOOSE(Month,M1,M2,M3,M4,M5,M6,M7,M8,M9,M10,M11,M12) to print the name of the month for any record that contains the number of the month. For example, if Month contains "7", ReportWriter will print "July", the contents of field M7.

The first argument in an @CHOOSE statement must be numeric; the "list" can include text or numeric entries, but not both. If you include both numbers and labels in the list, ReportWriter interprets the numbers as labels if the

@CHOOSE statement is in a text field. If it is in a numeric field, ReportWriter treats text in the list as zeros.

**@MATCH(TestItem,ListItem1,ListItem2,List-Item...):** @MATCH compares TestItem with the ListItems until it finds a match and then returns the number of the matched item in the list. For example, you may know the name of the month of the year, but you need to know whether it is the first, second, or nth month of the year. The formula @MATCH(Month,"January","February","March","April","May","June") returns "1" if Month contains the word "January", "2" if Month contains "February", and so on. The arguments must be either text or numeric, but @MATCH always returns a number.



# ReportWriter Tutorial...

## Tutorial

Now let's use some of these numeric functions to produce the report in *Figure 2*. You will need the *Example.1.SS* and *Example.2.DB* data files on the ReportWriter disk. *Example.1.SS* is a spreadsheet file that contains gradebook data for a hypothetical group of students. *Example.2.DB* contains demographic data for these students and uses the codes FR, SO, JR and SE to indicate whether a student is a Freshman, Sophomore, Junior, or Senior. You will produce a report that integrates these two files and substitutes the words "Freshman", "Sophomore", "Junior", and "Senior" for these codes. Your goal is to learn how to use the @CHOOSE and @MATCH functions and how to use an AppleWorks spreadsheet as a lookup file.

Proceed as follows:

1. Boot up a ReportWriter-enhanced copy of AppleWorks. Insert your ReportWriter disk into a drive and load the sample files *Example.2.DB* and *Example.1.SS* onto the AppleWorks desktop.
2. Launch ReportWriter and indicate that you want to produce a new report called *ClassScores*. Use the ReportWriter Editor to prepare the layout that appears in *Figure 3*. Use Open-Apple O and Section Positions to specify the title, heading, and the report body section.
3. Define the fields under the headings Student Name and Code as Master File fields. [Ed: Put the cursor on one of the asterisks in the field and issue an Apple-N command to define the field.] The file *Example.2.DB* is the source for these fields. Use the following information when you define each field:

Heading	Field name	Category
Student Name	Name	LastName
Code	GradeCode	Grade

Figure 4: Define Field Menu

File: ClassScores EDITOR Escape: Main Menu

---

Define field

1. Field number	4
2. Field name	TestScore
3. Source	Lookup by key
4. File	Example.1.SS SS
5. Column	
6. Lookup field	
7. Lookup column	
8. From row	1 To row 1
9. Format	Left
10. Print	Always
11. Other	

---

Type entry or use ⌘ commands Row: 1 Col: 1 ⌘-? for Help

Figure 5: Define Field Menu

File: ClassScores EDITOR Escape: Main Menu

---

Define field

1. Field number	4
2. Field name	TestScore
3. Source	Lookup by key
4. File	Example.1.SS SS
5. Column	F
6. Lookup field	Code
7. Lookup column	A
8. From row	5 To row 19
9. Format	Fixed Decimal places 0
10. Print	Always
11. Other	

---

Type entry or use ⌘ commands Row: 1 Col: 1 ⌘-? for Help

4. Define the one-character field in the work area as a Master File field called "StudentNum"; the category is "Number".
5. Name the field under the "Class" heading as "Class" and define the field a Calculation. Enter the formula @CHOOSE(@MATCH(GradeCode, "FR","SO","JR","SE"),"Freshman", "Sophomore","Junior","Senior")

The portion of the formula inside the parentheses (@MATCH(GradeCode,"FR","SO","JR","SE")) looks at the GradeCode in each record and



**Figure 6: Definitions of Homework and Lab Fields**

Under Heading	Field Name	Column	Lookup Field	Lookup Column	From Row	To	Format	# of Decimals	Field Type
Homework	HomeScore	K	StudentNum	A	5	19	Fixed	0	Numeric
Lab	LabScore	P	StudentNum	A	5	19	Fixed	0	Numeric

returns a number. A GradeCode of "FR" yields the number "1", "SO" yields "2" and so forth.

The @CHOOSE portion of the formula uses the number from @MATCH to select the correct label from the list "Freshman", "Sophomore", and so on. Thus, a code of "SE" yields an @MATCH value of "4" and the @CHOOSE label of "Senior".

Now you will get the Test, HomeWork, and Lab scores from the student gradebook in the spreadsheet file Example.1.SS.

- Put the ReportWriter cursor on the field under the heading Tests and enter an Apple-N to define this field. Name the field "TestScore". The source is "Lookup by key", and the file is "Example.1.SS". The Define Field Menu should look like the example in *Figure 4*.

Now you will identify the spreadsheet column that contains the data you want to print in the report. Then you will tell ReportWriter how to match each student's record from the data base file with the corresponding record in the spreadsheet. Proceed as follows:

- Select #5, "Column", from the Define Field Menu; the spreadsheet Example.1.SS will appear on the screen. Use the Arrow Keys to put the cursor in column F, the column that contains each student's total test score, and press the Return Key to accept this column.

ReportWriter will again display the Define Field Menu. Note the letter "F" (for Column F) that appears to the right of Column choice on the menu.

Now you want ReportWriter to look up the total of each student's test scores by matching the student number in the data base record with the student number in the spreadsheet.

- Select #6, "Lookup field", and press the Return Key. ReportWriter will list the currently

defined fields. Select StudentNum and press the Return Key.

Next, you must identify the spreadsheet column that contains the student number you want to match.

- Select #7, "Lookup column", and use the Arrow Keys to select the column that contains the student numbers. Then press the Return Key to return to the Define Field Menu.
- You usually do not need to search all the rows in the spreadsheet for a match. (For example, some rows may be reserved for a heading and other rows may contain data for a totally unrelated application.) ReportWriter runs faster if you tell the program to search only those rows that contain valid data.

To limit the search, select #8, "From row", from the Define Field Menu; ReportWriter will once again display the spreadsheet. Use the Up-Arrow and Down-Arrow Keys to select the top of the block of rows you want to search and press the Return Key. Then press the Down-Arrow Key to highlight the block of rows, and press the Return Key.

- You want ReportWriter to treat these test scores as numbers so you can use the numbers in later calculations. Follow these steps to define the field type as "numeric":
  - Select #9 from the Define Field Menu and define this field as fixed number format with no decimal places.
  - Select #11, "Other", then choose "Field type", and indicate that this is a numeric field.
  - Press the Escape Key to return to the Define Field Menu which should now look like the example in *Figure 5*.



12. Now use the data in *Figure 6* and repeat steps 5-10 to define the Homework and Lab fields. These will be "Lookup by key" fields from the spreadsheet file Example.1.SS.
13. Finally, you must define the calculated Total field. The total is the sum of the Test, Homework and Lab scores. Put the cursor on the first asterisk under "Total", issue an Apple-N command, and assign this field the name TotalScore. Then specify "Calculation" as the source and enter the formula "TestScore + HomeScore + LabScore". If ReportWriter does not accept the formula, return to the Editor screen and check the names you assigned to these fields.

Define the field as a numeric field with a Fixed Format and zero decimal places.
14. Now issue an Apple-G and print this report. Your output should look like the sample print-out in *Figure 2*.

### Conclusion

This month you learned how use ReportWriter's numeric, @CHOOSE, and @MATCH functions and how to print a report that contains both data base and spreadsheet data. Next month you will learn how to use ReportWriter's date functions and how to incorporate word processor text into your reports.

*[Dan Verkade is the author of TimeOut ReportWriter, DoubleData, SuperForms, and other popular AppleWorks enhancements.]*

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# New Beagle Products

**B**eagle Bros recently announced the release of Escape!, a keyboard remapping utility for Macintosh Classic and Macintosh LC keyboards. Apple moved the Escape, Backslash, and Tilde Keys on the new Macintosh keyboards, which will frustrate users running AppleWorks on Macintosh LC systems with Apple IIe emulator boards. Escape! remaps these keys to their original positions. The program includes labels you can put on the keys to remind yourself of the new function of each key.

Escape! has a suggested retail price of \$19.95 and is available from NAUG for \$12.95 plus \$3 s/h.

Beagle also announced the release of a network version of Outliner which adds all the features of Randy Brandt's Outliner program to the network version of AppleWorks 3.0 running on an Apple-Share network. The network version of Outliner costs \$349.75 from Beagle; version 1.2 is current.

Beagle announced the release of version 1.11 of TimeOut SuperForms, Dan Verkade's forms generating program. SuperForms uses TimeOut SuperFonts to generate forms you can print on your printer. FormFiller, a TimeOut module on the SuperForms disk, automatically fills in forms from an AppleWorks data base file.

SuperForms 1.11 is a maintenance release that fixes problems that occur when you run the program on systems equipped with a few brands of RGB cards. NAUG members who cannot run SuperForms on their RGB-equipped computers should update to version 1.11; return your original SuperForms disks to NAUG for a free replacement. We would appreciate, but do not require, a \$1 donation to help us defray the cost of this disk replacement program. If SuperForms 1.1 runs on your system, you do not need the version 1.11 update. Our thanks to Beagle Bros for supplying the replacement disks to NAUG.

*[Beagle Bros, 6215 Ferris Square, Suite 100, San Diego, California 92121; (619) 452-5500.]*



# Help with Beagle Bros Enhancements

by Nanette Luoma

## How to Use this List

To the left of each volunteer's name are numbers indicating the utilities the consultant supports. Volunteers are listed alphabetically by state.

- |                    |                  |
|--------------------|------------------|
| 1 = DeskTools      | 9 = ReportWriter |
| 2 = DeskTools II   | 10 = SideSpread  |
| 3 = FileMaster     | 11 = SpreadTools |
| 4 = Graph          | 12 = SuperFonts  |
| 5 = gs Font Editor | 13 = TeleComm    |
| 6 = Point to Point | 14 = Thesaurus   |
| 7 = PowerPack      | 15 = UltraMacros |
| 8 = QuickSpell     |                  |

	City	Home	Work
<b>Arizona</b>			
1-4,7-15	Clay Evitts	Tucson	602-885-9789
4,8,10,12	Bill Holmes	Chandler	602-899-4841

<b>California</b>			
1,12,14	Ken Armstrong	Porterville	209-781-3296
1,6,8,15	Dan Balsley	San Ramon	415-829-5085
8,12,14,15	Brian Blue	Danville	415-838-0997
1-4,7-15	James Davis	Hayward	415-489-7024
3,12,15	Don Farrar	Pleasant Hill	415-932-5509
1-4,6-15	David Gair	Los Angeles	213-469-9916
8	Jim Gentilucci	Los Osos	805-528-5049
1-15	Terry Higgins	Newark	415-745-7884
1-3,10	Lucien LaCour	Woodland Hills	818-348-7787
1-4,8,10-12,14,15	Berenice Maltby	Corona del Mar	714-640-7369
1-3,5,7,8,10-12,14,15	Will Nelken	San Rafael	415-459-0845
1-3	Jesus Orosco	Milpitas	408-270-1011

<b>Colorado</b>			
1,8,14,15	Gary P. Armour	Littleton	303-933-9493
8,11,15	Lyle Graff	Littleton	303-794-5970
4,8,10,14	Geoff Hollingsworth	Morrison	303-697-9277
8	John Lefebvre	Thornton	303-451-5558
8,12,14,15	John Loren	Littleton	303-978-0603
1-5,7,10-12,14,15	Stephen Reiss	Aspen	303-923-6172
15	Dr. Larry Thaele	Boulder	303-939-9072

<b>Connecticut</b>			
3,4,7,8,10-12,14,15	William Delaney	Enfield	203-745-4048
12	Martin Knight	Middletown	203-346-9698
1-4,6,7,10,15	Newton Shaffer	Gales Ferry	203-464-9716

<b>Delaware</b>			
15	W. Henry Linton, Jr.	Wilmington	302-478-3740

<b>Florida</b>			
1-5,7-15	H. Clay Bailey III	Jacksonville	904-744-2499
1-4,7-8,10-12,14-15	Bruce Pfeffer	Tallahassee	904-385-3447
1-15	Jeff Strichard	Ft. Lauderdale	305-587-9590
1-4,7,8,10-12,14,15	Mike Ungerman	Oviedo	407-366-0060

<b>Illinois</b>			
12,15	Mark Baniak	Park Ridge	312-825-6301
1-5,7-8,10,12,14-15	George Duffey	Bloomington	708-894-0849
1-3,8,12,14	Susan Husar	Chicago	312-631-5884

	City	Home	Work
<b>Indiana</b>			
1-3,7-8,10,12	Jack Countryman	Greensburg	812-663-4998
1-4,7-10,12,14,15	Kevin Gold	Indianapolis	317-290-8948
8	Laura J. Kelley	Gwynneville	317-763-7290

<b>Iowa</b>			
3,4,8,10,12,15	Keith King	Ft. Madison	319-372-9521

<b>Kentucky</b>			
3,4,11,12	Donald L. Corson	Louisville	812-256-3517

<b>Louisiana</b>			
1,3,6-8,10,12-15	Charles Fryling, Jr.	Baton Rouge	504-766-3120

<b>Maryland</b>			
2-4,10,12,14,15	Raymond Greenberg	Darnestown	301-330-4912
1-3,7-10,12-15	Ben Maser	Owings Mills	301-252-7884
1-15	Ray L. Settle	Arnold	301-647-9192
1-4,7,9,10,12-15	Woodrow Webster	Fallston	301-879-7034

<b>Massachusetts</b>			
1-3,8,14	Donald McCabe	Westport	401-294-6256
6,8,14	Chuck Scheffren	Marblehead	617-631-2787
15	Ed Stutsman	Shutesbury	413-259-1217

<b>Michigan</b>			
4,6,8,10,14	Jim Anker	Auburn Hills	313-391-0033
1,3,4,7-11,15	Michael McMinn	Swartz Creek	313-655-4442
1,8,10,12,14,15	Pete Ross	Wayne	313-728-8269
8,14	Deborah Williams	Grosse Ile	313-671-0267

<b>Minnesota</b>			
1-5,7,8,10-15	James Hirsch	Coon Rapids	612-421-8393
1,8,12,15	David E. Johnson	Minneapolis	612-824-2728
3,4,15	Dick Kenfield	Hopkins	612-938-4382
8,10,12,14-15	Sandra Redding	Marshall	507-532-2959
12-14	Peter Zambino	St. Paul	612-690-0536

<b>Missouri</b>			
1-5,7,8,10-12,14,15	Whit Crowley	Manchester	314-394-7955
1-5,7-12,15	Bob Suits	Columbia	314-445-6082

<b>Montana</b>			
3,7,8,11,14-15	Steve Bernbaum	Sheperd	406-373-6393

<b>Nebraska</b>			
1-15	Jim Corbin	Bellevue	402-291-7285
1-12,14,15	Dr. John Kelley	Omaha	402-397-3485
1-3,7,8,10-12,14,15	Larry B. McEwen	Hastings	402-463-2267

<b>Nevada</b>			
1-8,10-15	Keith Johnson	Sparks	702-626-2543

<b>New Hampshire</b>			
1-3,7-12,14,15	Phil Kirkpatrick	Keene	603-352-0640
7,15	Frank R Savory	Derry	603-434-5407
8,12,14	Bob Skinner	Plymouth	603-536-3626

<b>New Jersey</b>			
1-4,6-15	Pete Crosta	Nutley	201-667-6369
1,8,10,12,14,15	Link Keur	Augusta	201-875-2568
1-3,6-8,10,13,14	David Scott	Wall	201-531-0600



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<b>New Mexico</b>			
1-4,7-12,14,15	Willis George, Jr.	Albuquerque	505-897-4886 505-883-9743
1-3,6-8,10,11,14,15	Gary Young	Corrales	505-897-1770 505-897-1770
<b>New York</b>			
1,2,4,7,8,10-12,14,15	Bob Beer	Coram	516-928-6870
1-2,4,8,10,12-14	Linda Doscher	West Nyack	914-358-7064
3,4,7,8,10,14	David W. Gagnon	Gowanda	716-532-4870
3,4,7-12,15	Carlos M. Madan	Morrisonville	518-562-0779 518-359-3322
1-15	Larry Merow	Sayville	516-567-0603 516-422-0315
1-5,7-12,14,15	James L. Nicoll	Pittsford	716-381-9480 716-546-6732
8	Frances Snedeker	Larchmont	914-834-3081
3,4,8,10,12,14	Jerry Taylor	Rochester	716-964-3319
1,3,4,6,8,10,12,15	Terry Williamson	Orchard Park	716-662-5104 716-873-9750
<b>North Carolina</b>			
3-5,7-10,12	Marc Apfelstadt	Greensboro	919-282-1494 919-334-5970
1-4,7,8,10-12,14,15	Terry W. Robertson	Charlotte	704-536-4261 704-377-3939
<b>Ohio</b>			
1-4,7,8,10-12,14,15	Jason Chao	Cleveland Hts.	216-321-5451 216-844-3791
3,7,8,12,14	Don E. Fisher	Dayton	513-890-0428 513-461-2444
4,8,14,15	Jason Fogt	Lakeview	513-843-5779
1-3,7,8,10,11,15	Carman Greco	St. Clairsville	614-695-5026
1-5,7-15	Ltc. Robert Weis	Beavercreek	513-429-4169 513-257-6836
<b>Oregon</b>			
1,3,4,7,8,10,12,14,15	Jim Emig	Portland	503-771-1916 503-280-5666
1,4,8	Dave Lomax	Lake Oswego	503-636-7289
<b>Pennsylvania</b>			
1-3,7-12,14,15	Claude Davis, Jr.	Stewartstown	717-993-6874 717-845-3571
1-3,5-15	Martin Friedman	Broomall	215-353-2753
15	William D. Hall	Philadelphia	215-824-1160 215-441-0800
1-3,7,8,14	Joel Perlish	Havertown	215-789-7673
15	Charles Schultes Jr.	Leighton	215-377-5169 215-377-6180
1-15	Bruce Shanker	Warminster	215-674-0118
3,7,8,12,14,15	Hal Shapiro	Eagleview	215-630-8936 215-922-0500
<b>Rhode Island</b>			
12	Robert J Ricard	Cranston	401-781-5202
<b>Tennessee</b>			
8,12,14	Jerry Bruce	Bristol	615-652-7473 703-676-2999
1-3,7	Bob Evridge	Knoxville	615-693-8817 615-693-9242
6	Joel Goldman	Nashville	615-352-3617
<b>Texas</b>			
6	Larry Jones	El Paso	915-533-3302 915-565-3016
1-3,7,8,14,15	Joseph Kline	Lubbock	806-796-0829
1-5,7,8,10-12,14,15	Ramon Merlin	San Antonio	512-496-5331

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1,4,8,10,11,15	Bud Simrin	Fort Worth	817-246-0859
1-3,8,10,12,14	Jerry Don Venable	Liberty	409-336-3178 409-336-6958
<b>Vermont</b>			
3,7,8,14,15	Douglas C. Corey	Middlebury	802-388-6209 802-388-4021
4,8,10,12,15	Linda Metzke	Concord	802-748-3298 802-626-9371
<b>Virginia</b>			
7-8,10,12,14-15	Peter Pfeiffer	Herndon	703-437-1985 703-834-3618
<b>Wisconsin</b>			
7,8,15	Debby Henning	Sharon	414-736-9229
15	Todd Novakofski	Ladysmith	715-532-7430 715-532-6202
<b>Australia</b>			
1-3,6,8,10,11,14,15	Dr. Jules S. Black	Bondi Junction	612-327-7501 612-389-8881
5,10,12	Ralph Morgan	Tweed Heads	075-369352
<b>Canada</b>			
4,8,15	Michael Beebe	Victoria	604-477-4630 604-721-7954
3,4,6,10,11	John Carson	Montreal	514-965-0886
7	Patrick M. Duffy	Lethbridge	403-329-4211
1-3,7-8,10-12,14,15	Jean Guy Mariage	Montreal	514-844-2932 514-252-2541
1-3,7,8,12,14,15	Terry Price	Schomberg	416-939-8104
5,8,10,12	Robert Sutherland	Toronto	416-465-2945
1,2,7,8,12,15	Nick Van Helsdingen	Tranquillity Base	604-296-3260
<b>England</b>			
12,14,15	Terry Cymbalisty	Leeds	0532 525038
4,7,15	Andrew C. Letchford	Plymouth	0752-766435 44752-766435
6	John Richey	Surrey	44 252 723993 44 71409 0092
<b>Israel</b>			
12,14,15	Bernard Katz	Ramat Aviv	(03) 425-011 1 (03) 752-1133
<b>New Zealand</b>			
7,8,12,15	H.P.H. Harrison	Tauranga	075-442-842 075-778-000
<b>Saudi Arabia</b>			
3,6,8,15	Ken Burnell	Dhahran	3-878-9173 3-875-0051
6	James E. Hanushek	Dhahran	3-878-4075 3-877-1533
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Electronic Index Disk February 1991 Update; Enter the default values for these categories: Volume #: 6 • Issue #: 2 • Date: Feb 91

Letters to NAUG • 2 • A Caveat about @IRR and @NPV • Hayden, Kent • @IRR; @NPV; spreadsheets; formulas; formatting  
 Letters to NAUG • 2 • Another Use for the BBS • Moore, Armond • BBS; file transfers; Electronic Forum  
 Letters to NAUG • 3 • User Recommends Diconix Printer • Bunker, Herb • DeskJet; printers; Diconix  
 Spreadsheet Tips • 5 • How to Use @PV • Hecker, Stan • @PV; spreadsheets; finance; AppleWorks 3.0; formulas  
 AppleWorks Applications • 9 • How to Prepare Tax Reports • Diamond, Diana Crawford • data base; taxes; finance; report formats  
 Applied Engineering Update • 12 • New Fax Modems for GS/OS • N/A • Applied Engineering; GS/OS; Fax; modems  
 Inside AppleWorks • 13 • Spreadsheet Data Structure — Part 2 • Verkade, Dan • spreadsheets; file formats  
 AppleWorks News • 19 • Late News and Special Offers for NAUG Members • N/A • NAUG; A2 Central; Apple Computer; ISTE; JEM Software; Quality Computers; S.A. AuTeur; Seven Hills; SoftSpoken; WestCode Software; 1040Works; GS/OS; HyperCard IIcs; FlexiCal; SuperPatchNet; EuroWorks; SuperConvert; CrossWorks; InWords; Fax; AppleTalk; reprints; Apple Access II; education; users groups  
 My Favorite Macro • 24 • Make It Easier to Produce Special Characters • Johnson, Keith • macros; UltraMacros; SuperFonts; foreign languages; foreign characters  
 Quick Tip • 27 • How to Delete Subdirectories • Brandt, Randy • deleted files; subdirectories  
 ReportWriter Tutorial • 28 • How to Use ReportWriter's Numeric Function • Verkade, Dan • ReportWriter; report formats; formulas; TimeOut  
 Beagle Bros Update • 33 • New Beagle Products • N/A • Escapel; Beagle Bros; Outliner; SuperForms  
 Members Helping Members • 34 • Help with Beagle Bros Enhancements • Luoma, Nanette • DeskTools; FileMaster; Graph; gs Font Editor; Point to Point; PowerPack; QuickSpell; ReportWriter; SideSpread; SpreadTools; SuperFonts; TeleComm; Thesaurus; UltraMacros; TimeOut; Beagle Bros  
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